POTENTIAL IMPLICATIONS OF THE MEDICARE ADVANTAGE STARS METHODOLOGY FOR PLANS SERVING LOW SOCIOECONOMIC STATUS COMMUNITIES

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ABSTRACT

Elizabeth Cahn Goodman: The Potential Implications of the Medicare Advantage Stars Methodology for Plans Serving Low Socioeconomic Status Communities
(Under the direction of Pam Silberman)

Medicare Advantage (MA) now serves nearly one-third of all Medicare beneficiaries. Many MA participants have low socioeconomic status (SES). The Affordable Care Act (ACA) modified the five-star quality measurement program applied to MA plans ("Medicare stars") imposing substantial financial incentives and penalties based on plan performance.

This study uses a mixed methods approach to examine (1) whether and how serving low-SES participants impact an MA plans' ability to achieve high Medicare stars scores, (2) whether plans are using enhanced and supplemental benefits to offset SES-related barriers to high performance under the Medicare stars program, and (3) changes policy makers should consider to offset SES-related barriers to high-quality performance under the Medicare stars program.

Thirty key informants were interviewed in phase one. Each expressed support, often qualified, for the Medicare Stars program. Each concurred that beneficiary SES factors impact the level of effort required of MA plans to achieve a high Medicare stars scores. They identified a number of specific SES factors that form barriers to high-quality performance and an array of recommended policy changes designed to acknowledge and to offset those barriers.

Phase two uses a multivariate analysis of publicly available plan filing data for the years 2014 and 2015 to examine the effect of the percentage of low-income subsidy (LIS) eligible beneficiaries and the level of deprivation in the county in which the plan was offered on the inclusion of benefits and plan design features identified by phase one respondents as likely to offset SES-related barriers to quality care. Neither the percentage of LIS-eligible membership nor county-level deprivation were consistently found to be significantly associated with the inclusion of any of the studied benefits, other than supplemental

meals. Designation as a Special Needs Plan (SNP) was significantly associated with the inclusion of nearly all of the studied benefits.

In phase 3, five of the phase one respondents participated in follow-up surveys and interviews to evaluate the policy recommendations most commonly made by the phase 1 key informants. Those recommendations form the basis for the plan for change presented in the final chapter.

To Adam, Alex, and Jimmy Goodman for their support, encouragement, and endless tolerance and to Alec Cunningham, who not only believed in me,
but made this degree possible.

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LIST OF ABBREVIATIONS

ACA	The Patient Protection and Affordable Care Act and Health-Related Portions of the Health Care and Education Reconciliation Act of 2010, otherwise referred to as the Affordable Care Act
ACO	Accountable Care Organization
ADI	Area Deprivation Index
AHIP	America's Health Insurance Plans
BCBSA	Blue Cross Blue Shield Association
BIPA	Benefits Improvement and Protection Act of 2000
BBA	Balanced Budget Act of 1997
CAHPS	Consumer Assessment of Health Care Providers and Systems
CDC	Centers for Disease Control
CMS	Centers for Medicare and Medicaid Services
COPD	Chronic Obstructive Pulmonary Disease
DSNP	Dual Special Needs Plan
HCFA	Health Care Financing Administration (predecessor agency to CMS)
HEDIS	Healthcare Effectiveness Data and Information Set
HHS	U.S. Department of Health and Human Services
HMO	Health Maintenance Organization
HOS	Health Outcomes Survey
HRRP	Hospital Readmissions Reduction Program
MA	Medicare Advantage
MA-PD	Medicare Advantage and Medicare Part D Health Plan
MedPAC	Medicare Payment Advisory Commission
MIPPA	Medicare Improvements for Patients and Providers Act of 2008
MMA	Medicare Prescription Drug Improvement and Modernization Act of 2003
MMCO	Medicare and Medicaid Coordination Office of the Centers for Medicare and Medicaid Services

MSA	Medical Savings Account Plan
NCQA	National Committee on Quality Assurance
NQF	National Quality Forum
PDP	Part D Plans
PFFS	Private Fee for Service Health Plan
PPO	Preferred Provider Organization
PQA	Pharmacy Quality Alliance
RFB	Religious Fraternal Benefit Plans
SES	Socioeconomic Status
SNP	Medicare Advantage Special Needs Plan
TEFRA	Tax Equity and Fiscal Responsibility Act

CHAPTER 1: INTRODUCTION

Section 1.1 Statement of the Issue

As of December 2016, nearly 18.7 million Medicare beneficiaries received their health insurance benefits through the Medicare Advantage (MA) program (*Medicare Advantage, Cost, PACE, Demo, and Prescription Drug Plan Contract Report - Monthly Summary Report*, 2016). Many of these MA enrollees possess socioeconomic characteristics (educational achievement, income, poverty, and wealth) often associated with poorer health outcomes. A higher proportion of MA participants are low income and/or members of racial and ethnic minority communities compared with participants in traditional Medicare. In 2012, 58.5% of MA participants had incomes below $29,999, as compared with 37.8% of beneficiaries in traditional Medicare, and 30% of MA participants were Hispanic or African American versus 23% of traditional Medicare participants (Americas Health Insurance Plans Center for Policy and Research, 2015).

MA serves a slightly smaller proportion of individuals who are dually eligible for Medicare and Medicaid ("dual eligibles") than the traditional Medicare program. According to the Medicare Payment Advisory Commission (MedPAC), individuals who are dually eligible represent 16% of MA participants while they represent 19% of participants in the traditional Medicare program (Harrison & Zarabozo, 2014). However, the number of dual eligibles participating in MA is rapidly growing. Between 2009 and 2012, the number of individuals dually eligible for Medicare and Medicaid who participated in MA increased from 11% to 23% (Harrison & Zarabozo, 2014).

Since 2008 the quality of MA plans has been measured by the Centers for Medicare and Medicaid Services (CMS) using a five-star scale referred to as the Medicare Stars program ("MA stars"). In an effort to improve the quality of care delivered by MA plans the Affordable Care Act (ACA) imposed substantial incentives and penalties on MA plans based on their annual Medicare stars performance. In

doing so, the ACA transformed the Medicare stars program from solely a quality measurement program to an important component of how MA plans are paid (PPACA, 2010).

The MA stars methodology grades each contract on a broad set of clinical and operational quality measures. Each measure includes specific inclusion and exclusion criteria designed to ensure that only patients who are clinically eligible for and would benefit from the measured service or procedure are included in the determination of whether a health plan delivered the appropriate care or achieved the appropriate outcome. Plan sponsors enter into contracts with the CMS. These contracts may include one or more health plans. CMS grades the performance of each MA contract on each measure by applying one of two statistical methods, clustering or relative distribution and significance testing. In this way each contract's performance on a given measure is judged relative to all other measured contracts (*Medicare 2017 Part C & D Star Rating Technical Notes*, 2016). For the 2017 plan year, CMS evaluated part C plans on 32 quality measures quality and part D plans on 15 (*Medicare Part C & D Star Ratings: Update for 2017: August 3, 2016 Part C & D User Group Call*, 2016). Plans that offer both Medicare parts C and D are evaluated based on the full set of measures.

CMS groups individual quality measures at a second level into a series of domains. Domain level scores reflect a combined measurement of similar services (*Medicare 2017 Part C & D Star Rating Technical Notes*, 2016) The part C domains are: staying healthy, managing chronic conditions, member experience with health plan, member complaints, and changes in the health plan's performance and health plan customer service. The part D domains are: drug plan customer service, member complaints and changes in the drug plan's performance, member experience with drug plan, and drug safety and accuracy of drug pricing. Plans receive scores based on each individual measure, the domain, and the plan type (Medicare part C or part D), as well as an overall score (*Medicare 2017 Part C & D Star Rating Technical Notes*, 2016).

While the socioeconomic characteristics of plan members substantially vary between plans, only a small subset of the measures is adjusted for other factors, including socioeconomic status characteristics (*Report to Congress: Social Risk Factors and Performance Under Medicare's Value-Based Purchasing*

Program, 2016). Several studies have shown that health plans with high proportions of members with low socioeconomic status (SES), including members who are dually eligible for Medicare and Medicaid, tend to score lower under the MA stars methodology (Cahow, Creighton, & Richards-Burke, 2010; Inovalon, 2013, 2015, 2014b; *Report to Congress: Social Risk Factors and Performance Under Medicare's Value-Based Purchasing Program*, 2016; Young, Rickles, Chou, & Raver, 2014). This performance variation has caused plans and provider organizations to raise concerns about whether the stars rating and payment system, as currently implemented, fairly judges the performance of health plans serving higher proportions of members with low SES status and led CMS in 2017 to apply an interim adjustment to plans' star score results in order to account for performance variation on certain stars measures based on the proportion of low income subsidy, dual eligible and disabled members served under the contract (*Announcement of Calendar Year (CY) 2017 Medicare Advantage Capitation Rates and Medicare Advantage and Part D Payment Policies and Final Call Letter*, 2016). Further, this performance differential raises questions about whether the current Medicare stars rating system has inadvertently created incentives for MA plans to avoid serving low SES communities.

Section 1.2 Study Questions

A significant body of literature examines the negative impact that the social risk factors, including low SES, have on individuals' experiences with the health care system, access to care, and overall health outcomes (Adler & Newman, 2002; Adler & Stewart, 2006; Braveman, Egerter, & Williams, 2011; Heiman, 2015; National Academies of Sciences, 2016b; Pampel, 2010; Young, 2005). Failure to fully account for SES characteristics in measuring health plan quality could place plans that serve substantial numbers of individuals with low SES and the providers that participate in these plans' networks at a significant financial and, to the extent that consumers rely on the Medicare stars in choosing a health plan, a significant reputational disadvantage as a consequence of the program. The purpose of this study is to more fully understand the implications of the post-ACA Medicare stars quality measurement methodology to begin to answer the following questions: What impact, if any, has the post-

ACA MA stars methodology had on Medicare Advantage beneficiaries in the form of changes to the products and services offered by Medicare Advantage plans serving socially and economically vulnerable Medicare beneficiaries? And, what steps can and should policy makers and organizational leaders take to offset SES-related barriers, if any, to high stars performance among plans serving high proportions of low SES members?

Section 1.3 Study Design

The study consists of three phases. Phase one is a qualitative analysis of the interviews of thirty key informants who represent six different Medicare stakeholder groups: Provider representatives; Consumer representatives; Plan representatives; Regulators, policy makers, and quality measurement officials ("Regulators"); and academics and thought leaders ("Thought leaders"). Phase two is a quantitative analysis of MA plan benefit packages. This phase of the study evaluates the impact of the proportion of low-income plan members (those eligible for a low-income subsidy under Medicare part D) and the level of deprivation of the county in which a plan operates (as measured using the Area Deprivation Index (Health Innovation Program, 2014)) on the inclusion of certain plan design features (a premium payment requirement and specific supplemental benefits) identified by key informants in phase 1 as associated with SES-related barriers to high-quality care. In phase three, five of the key informants who participate in phase one participate in follow-up interviews to provide their perspective on policy recommendations commonly made by key informants in phase one. The results of phase 3 inform the plan for change which is the final phase of the research.

CHAPTER 2: SIGNIFICANCE OF THE ISSUE

Millions of Americans rely on MA for the delivery of their health care services. Plan participation, plan financing, and, ultimately, consumer choice of plans and benefit packages are substantially impacted by performance under the post-ACA MA stars methodology. If the program improves the quality of care delivered by MA plans and reduces disparities between high and low resource communities, program enrollees could greatly benefit from these policy changes However, if, by failing to consistently account for the SES characteristics of MA plan members, the Medicare stars program creates disincentives sufficient to cause plans to avoid serving communities with SES-related risk characteristics, program enrollees could lose access to the plans and supplemental benefits on which they have come to rely.

The Medicare stars quality measurement system is one among a large and growing number of quality measurement systems currently in use in the Medicare program and elsewhere in the United States and globally to judge the quality of health care. Many of these programs use measures similar to those used in the Medicare stars program. As a result, the findings of this study can inform discussions not only about the appropriateness of including SES characteristics in the MA stars methodology but also in similar programs applied to the performance of physicians, hospitals, and other providers in the traditional Medicare program and elsewhere.

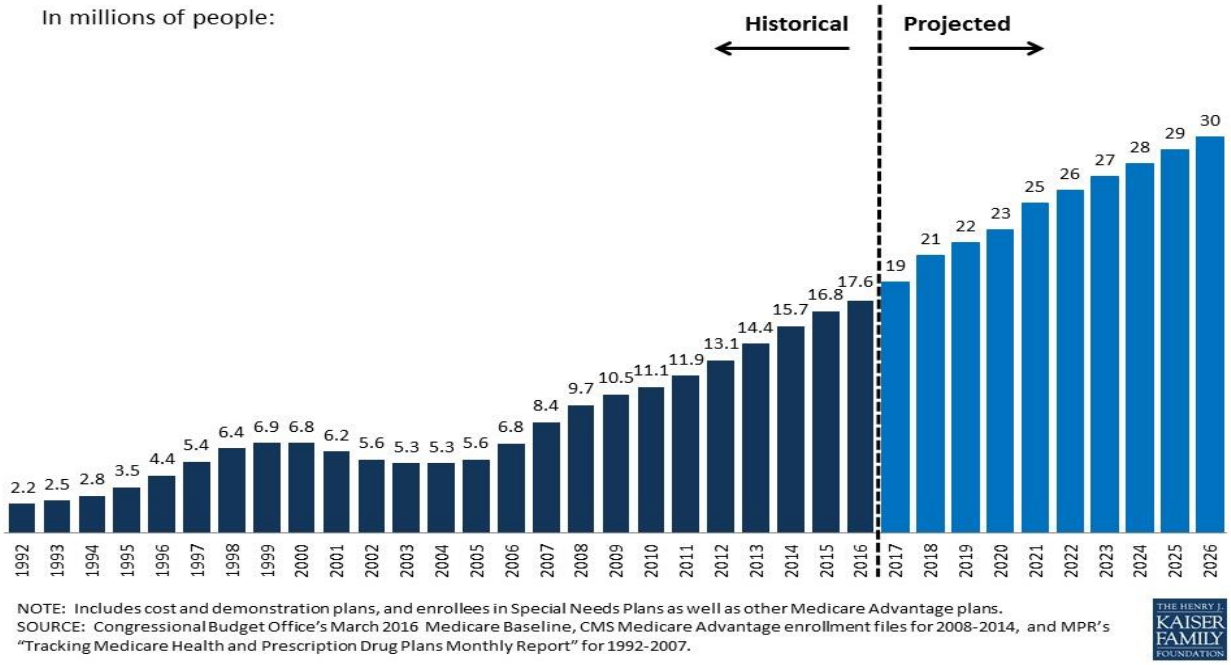
Finally, the results of this study complement ongoing work in this area by CMS and the U.S. Department of Health and Human Services Office of the Assistant Secretary for Planning and Evaluation (ASPE) (*Announcement of Calendar Year (CY) 2017 Medicare Advantage Capitation Rates and Medicare Advantage and Part D Payment Policies and Final Call Letter*, 2016; National Academies of Sciences, Engineering and Medicine. (2016c),; National Academies of Sciences, 2017; *Examining the Potential Effects of Socioeconomic Factors on Star Ratings*, 2015; *Report to Congress: Social Risk*

Factors and Performance Under Medicare's Value-Based Purchasing Programs, 2016) by providing a detailed qualitative and quantitative analysis of the impact of the post-ACA stars methodology on Medicare Advantage health plans serving large populations of low SES beneficiaries and by identifying and analyzing proposed policy options for improving the quality of care delivered to low SES populations participating in Medicare Advantage.

CHAPTER 3: BACKGROUND

Medicare provides preventive, acute, and post-acute health care to older and disabled Americans. Established in 1965, Medicare is among the country's two largest social safety net programs. The use of private health plans in Medicare has long been a matter of some controversy. Initially authorized in 1972, the program, now referred to as MA, serves more than 18.7 million beneficiaries today (*Medicare Advantage, Cost, PACE, Demo, and Prescription Drug Plan Contract Report - Monthly Summary Report*, 2016) and is projected to grow to 30 million by 2026 (*Total Medicare Private Health Plan Enrollment, Current and Projected*, 2016).

Figure 1. Total MA enrollment, 1992-2026



According to MedPAC, in 2010, the year the ACA passed, health plans participating in MA were paid 109% of the cost of serving an individual in the traditional Medicare program. For 2016, MedPAC found that while plan bids, on average, were estimated to be 98% of the cost of serving a beneficiary in

the traditional Medicare program because 70% of MA participants will be in plans that are eligible for quality bonuses, MA plans will be paid, on average, 102% of what it costs to serve a beneficiary in the same county under the traditional Medicare program (Commission, 2016).

The remainder of this chapter will review of the legislative history of the use of private health plans in Medicare, a history of the use of quality measurement in Medicare participating health plans, and a description of post-ACA policy activity related to the issue of including SES factors to help determine Medicare health plan performance on quality measures. Because the focus of this dissertation is solely on the impact of the post-ACA stars methodology on the delivery of quality care to low SES populations, this section is not intended to provide a full social and political history of the use of private health plans in the Medicare program.

Section 3.1 History of Managed Care in Medicare from Inception to the ACA

The Medicare program was established in 1965 (The Social Security Amendments of 1965, 1965) to provide health insurance coverage to elderly (ages 65 and up) beneficiaries of Social Security. Later, in 1972, the Social Security Act was amended to expand Medicare coverage to individuals with disabilities and end-stage renal disease. The Social Security Act also was amended that year to enable Medicare to contract with managed care plans. (McDowell, 2009) In 1982, Congress passed the Tax Equity and Fiscal Responsibility Act (TEFRA), which authorized Medicare to contract with health maintenance organizations (HMOs) at 95% of the average cost of serving a Medicare beneficiary in the traditional Medicare program in the county in which the plan was offered (McDowell, 2009; *Medicare Advantage Fact Sheet*, 2014). In 1995, Republican majorities in Congress attempted to wring substantial savings from the Medicare program, including efforts to impose spending caps on Medicare and to broadly expand private Medicare plans. This effort was ultimately vetoed by President Bill Clinton (Oberlander, 2003).

In 1997, under mounting concerns regarding the federal budget deficit and concerns about the cost of the HMO program, lack of competition between plans, and limited plan coverage areas, Congress

passed the Balanced Budget Act (BBA) (Oberlander, 2003; McDowell, 2009; Scanlon, 1999). The BBA created the Medicare+Choice program. Beginning in 1999, as a result of the BBA, Medicare began contracting with preferred provider organizations (PPOs), private fee-for-service plans (PFFSs), and Medical Savings Account Plans (MSAs) (Christensen, 1997; Payments to Medicare+Choice Organizations, 2010). In addition, the BBA reduced plan cost growth; established a per county payment floor to attract plans to underserved, especially rural counties; and enhanced the risk adjustment program used to reflect the health of the beneficiaries participating in each Medicare health plan. (Scanlon, 1999). The Benefits Improvement and Protection Act (BIPA) of 2000 expanded these payment floors to additional areas (*Medicare Advantage Fact Sheet*, 2014).

The Medicare Prescription Drug, Improvement, and Modernization Act of 2003 (MMA) renamed Medicare+Choice Medicare Advantage and established the Medicare drug benefit (Medicare part D). MMA authorized three types of Medicare health plans: those that offered only drug benefits (part D plans), those that offered only the services covered in Medicare parts A and B (MA plans), and those that offered both the services covered in Medicare parts A and B and drug benefits (MA-PD plans) (CMS, 2011; The Medicare Prescription Drug, Improvement and Modernization Act of 2003, 2003).

In response to concerns that MA plans were gaming the risk adjustment system. the Deficit Reduction Act of 2005 required CMS to make an across-the-board adjustment to the MA plan risk scores to make them more consistent with FFS coding (The Medicare Advantage Program: Status Report, 2016).

In 2006, Medicare instituted a bidding process in which plans submit packages of benefits that meet parameters established by CMS and that are based on the average cost of delivering the services covered under Medicare parts A and B and, in the case of MA-PD plans, Medicare part D (*Medicare Advantage Fact Sheet*, 2014). These bids are compared against a cap or benchmark amount for the service area (CMS, 2011). If the bid is lower than the benchmark, the plan may use the difference or rebate amount to provide supplemental benefits or to lower the out-of-pocket costs imposed on beneficiaries (CMS, 2011). Payments to each MA plan are risk adjusted to reflect the health status of their membership using a formula referred to as the CMS-Hierarchical Condition Category (HCC) risk adjustment model

(CMS, 2011). This model adjusts plan payments to reflect beneficiary health conditions, eligibility for Medicaid, residence in an institution and disability as a reason to Medicare entitlement but does not account for other SES-related characteristics, for example educational attainment or residency in a high poverty or high crime area.

The Medicare Improvements for Patients and Providers Act of 2008 (MIPPA) changed the benchmark setting process to remove the cost of medical education from the calculation of MA benchmarks and made other changes to the program, including changes designed to increase the coordination of Medicare and Medicaid benefits and slow the growth of certain types of MA plans (McDowell, 2009; *Medicare Advantage Fact Sheet*, 2014; Medicare Improvements for Patients and Providers Act of 2008, 2008).

Table 1. Time line: Evolution of Medicare-managed care and quality measurement in MA

Month	Year	Action
July	1965	The Medicare program is established to provide health insurance coverage to elderly (ages 65 or up) beneficiaries of Social Security (Social Security Act: Title XVIII-Health insurance for the aged and disabled, 1965).
October	1972	The Social Security Act is amended to enable Medicare to contract with health maintenance organizations (Social Security Act: Title XVIII-Health insurance for the aged and disabled, 1965).
October	1972	The Social Security Act is amended to cover individuals with disabilities and end-stage renal disease in Medicare (Social Security Act: Title XVIII-Health insurance for the aged and disabled, 1965).
	1982	Medicare initiates quality improvement activities in Medicare health plans (McIntyre, Rogers, & Heier, 2001).
September	1982	Tax Equity and Fiscal Responsibility Act (TEFRA) authorizes Medicare to contract with health maintenance organizations (HMOs) at 95% of the average cost of serving a Medicare beneficiary in the relevant county (*Medicare Advantage Fact Sheet*, 2014).
December	1995	Republicans in Congress attempt to wring substantial savings from the Medicare program, including efforts to impose spending caps on Medicare and to broadly expand private Medicare plans. The effort is vetoed by President Bill Clinton (Oberlander, 2003).
	1996	CAHPS is implemented in Medicare+Choice (McIntyre et al., 2001).
	1996	Medicare+Choice plans begin submitting HEDIS data (Emergency Clearance: Public Information Collection Requirements, 1996).
August	1997	The Balanced Budget Act (BBA) passes, thereby creating the Medicare+Choice program (The Balanced Budget Act, 1997).
	1998	The Health Outcomes Survey (HOS) is developed by CMS, NCQA, Health Assessment Lab (HAL), and other experts and implemented by CMS (Health Services Advisory Group, 2014).

Month	Year	Action
	1999	Authorized under the BBA, Medicare begins contracting with preferred provider organizations (PPOs), private fee-for-service plans (PFFSs), and Medical Savings Account Plans (MSAs) (Christensen, 1997; Payments to Medicare+Choice Organizations, 2010).
December	2000	The Benefits Improvement and Protection Act (BIPA) is expanded to floors on payments to Medicare+Choice plans (*Medicare Advantage Fact Sheet*, 2014).
December	2003	The Medicare Prescription Drug, Improvement, and Modernization Act (MMA) is renamed Medicare+Choice Medicare Advantage; the Medicare drug benefit (Medicare part D) is established (CMS, 2011; The Medicare Prescription Drug, Improvement and Modernization Act of 2003, 2003).
	2006	Medicare institutes a bidding process based on the average cost of delivering the services covered under Medicare parts A and B and, in the case of MA-PD plans, Medicare part D (*Medicare Advantage Fact Sheet*, 2014).
	2007	CMS begins grading Medicare part D plans using a star rating system (*Medicare Part D Performance Metrics Technical Notes November 9, 2006*, 2006; Pharmacy, 2014; *Statement by Kerry Weems Acting Administrator CMS Centers for Medicare & Medicaid Services on Medicare Advantage Increased Spending Relative to Medicare Fee-for-Service*, 2008).
March	2007	Sen. Max Baucus (D-MT) announces a broad outline for health care reform (Health Care Reform from Conception to Final Passage, 2010).
	2008	CMS commences grading MA and MA-PD plans by using a 1- to 5-star rating system (*Medicare Health Plan Quality and Performance Ratings Technical Notes 11/01/2007*, 2007).
June	2008	Medicare Improvements for Patients and Providers Act (MIPPA) changes the benchmark setting process, increases the coordination of Medicare and Medicaid benefits, and slows the growth of certain types of MA plans (Medicare Improvements for Patients and Providers Act of 2008, 2008).
October	2009	Senate considers House Resolution 3590 (HR 3590), the Service Members Home Ownership Tax Act by Representative Charles Rangel (D-NY), which had passed the House (Service Members Home Ownership Tax Act of 2009, 2009).
October	2009	Senate Bill 1796 ("S 1796"), America's Healthy Future Act, is approved by the Senate Finance Committee (America's Healthy Future Act, 2009).
October	2009	The Preservation of Access to Care for Medicare Beneficiaries and Pension Relief Act of 2010, House Resolution 3962 (HR 3962), is introduced to the House of Representatives (Preservation of Access to Care for Medicare Beneficiaries and Pension Relief Act of 2010, 2010).
March	2010	The House of Representatives concurs in the Senate amendments to HR 3590 and, along with it, passes the Health Care and Education Reconciliation Act, House Resolution 4872 (HR 4872) (Health Care and Education Reconciliation Act of 2010, 2010).
March	2010	The Patient Protection and Affordable Care Act is presented to and signed by President Obama on March 23, 2010 (The Affordable Care Act, 2010).
	2011	CMS requires MA and part D contracts with more than 600 members to administer a plan-specific CAHPS survey (Quality).
	2012	Medicare stars quality bonus demonstration program begins (Cosgrove, 2012)

Month	Year	Action
	2013	Health Outcomes Survey (HOS) (v.2.5) is implemented (Health Services Advisory Group, 2014).
March	2014	An expert panel appointed by the National Quality Forum (NQF) issues a draft report in which they recommend that certain quality measures be risk adjusted to account for sociodemographic differences, in addition to differences based on health status (National Quality Forum, 2014b).
August	2014	NQF Board of Directors ratify a trial to assess the impact of risk adjusting certain measures for sociodemographic factors (National Quality Forum, 2014c).
September	2014	CMS uses their regulatory discretion not to terminate plans that score fewer than three Medicare stars for three consecutive years and issues a request for information regarding differences in star rating performance among plans serving individuals who are dually eligible for Medicare and Medicaid and those who are only eligible for Medicare (Centers for Medicare and Medicaid Services, 2014f).
September	2014	NQF Consensus Standard Approval Committee adopts parameters for the SES adjustment trial (National Quality, 2014d).
October	2014	The Improving Medicare Post-Acute Care Transformation Act of 2014 ("the IMPACT Act") becomes law, thereby requiring the Secretary to conduct a study that examines the effect of individuals' SES on quality measures, resource use, and other measures for individuals under Medicare (Improving Medicare Post-Acute Care Transformation Act of 2014, 2014).
November	2014	CMS closes the opportunity to reply to a request for information regarding differences in star rating performance among plans serving individuals who are dually eligible for Medicare and Medicaid and those who are only eligible for Medicare (Sanders, 2014).
December	2014	The Quality Bonus Demonstration program ends (Cosgrove, 2012).
February	2015	CMS issues the Advance Notice of Methodological Changes for Calendar Year (CY) 2016 for Medicare Advantage (MA) Capitation Rates, part C and part D Payment Policies and 2016 Call Letter ("The Advance Notice") and proposes a change (reduce the weight of seven targeted measures by 50%) to the stars methodology for all plans regardless of the proportion of LIS/dual membership (Advance Notice of Methodological Changes for Calendar Year (CY) 2016 for Medicare Advantage (MA) Capitation Rates, Part C and Part D Payment Policies and 2016 Call Letter, 2015).
March	2015	HHS issues a notice of intent to award a single source contract to the National Academy of Science Institute of Medicine (now the National Academy of Medicine (NAM)/National Research Council to conduct the IMPACT Act study (Accounting for Socioeconomic Status in Medicare Payment Program, 2015).
April	2015	NAM convenes an ad hoc committee to provide a definition of SES for the purposes of application to Medicare quality measurement and payment programs, to identify the social factors that have been shown to impact health outcomes of Medicare beneficiaries, and to specify criteria that could be used in determining which social factors should be accounted for in Medicare quality measurement and payment programs (Accounting for Socioeconomic Status in Medicare Payment Program, 2015).

Month	Year	Action
April	2015	CMS issues the Announcement of Calendar Year (CY) 2016 Medicare Advantage Capitation Rates and Medicare Advantage and part D Payment Policies and Final Call Letter. They reverse course and confirm their intent to terminate any remaining contracts that score fewer than three stars for three years in either Medicare part C or part D (Announcement of Calendar Year (CY) 2016 for Medicare Advantage (MA) Capitation Rates and Medicare Advantage and Part D Payment Policies and Final Call Letter, 2015).
April	2015	A memorandum is issued by the NQF staff outlining the process for the SES adjustment trial period, a time line for further activity, and evaluation criteria (Burstin, Amin, & Isijola, 2015).
September	2015	CMS releases technical notes of RAND Corporation study of the effect of low-income and disability status on MA plan performance on 16 clinical quality measures finding that socioeconomic status does not show significant independent effect on quality scoring when LIS/disability is taken into account (Centers for Medicare and Medicaid Services, 2015a, 2015b).
September	2015	MedPAC presents findings of an analysis of variation in quality measures across plans by plan population mix discussing alternative methodologies and justifications for calculating star rating bonus payments (Zarabozo, 2015).
November	2015	CMS releases a request for comments on the proposed 2017 stars methodology, including two proposed interim adjustment methodologies: application of a categorical adjustment index (CAI) and the use of indirect standardization (IS) (Larrick, 2015).
February	2016	CMS proposes moving forward with the application of a categorical adjustment index (CAI) approach, beginning with the 2017 Star Ratings (Advance Notice of Methodological Changes for Calendar Year (CY) 2017 for Medicare Advantage (MA) Capitation Rates, Part C and Part D Payment Policies and 2017 Call Letter, 2016).
April	2016	CMS finalizes the application of the CAI for 2017 in the final call letter (Announcement of Calendar Year (CY) 2017 Medicare Advantage Capitation Rates and Medicare Advantage and Part D Payment Policies and Final Call Letter, 2016).
October	2016	CMS releases the 2017 star results and are the first to include the CAI calculation. Based on those results, approximately 49% of all MA-PD plans, nearly 68% of enrollment weighted plan membership received four or more stars, and over 90% of MA-PD enrollees are in contracts with ratings of 3.5 or more stars. 23 contracts: 14 MA-PD, 3 MA-only, and 6 PDP received five stars (2017 Star Ratings, 2016).
December	2016	On December 13, 2016 President Barack Obama signed HR 34, the 21st Century Cures Act (21st Century Cures Act, 2016). HR 34 delayed termination of persistently low-performing MA plans pending the results of the IMPACT Act studies.
December	2016	ASPE releases the first of the reports required under the IMPACT Act modeling the impact of social risk factors on performance under Medicare's value based purchasing programs finding a relationship between social risk and performance under the MA Stars methodology both between contracts serving high and low proportions of beneficiaries with social risk factors and within contracts and laying out a series of policy options for addressing this performance differential (Report to Congress: Social Risk Factors and Performance Under Medicare's Value-Based Purchasing Programs, 2016).

Month	Year	Action
	2016-2017	The NAM releases five reports on Accounting for Social Risk Factors in Medicare Payment defining social risk factors, examining best practices in serving populations with social risk factors, defining criteria, factors and methods to account for social risk factors in Medicare payment, identifying current and potential data sources that could be used to account for social risk factors in Medicare payment and making recommendations based on those analyses (Board on Population Health and Public Health Practice; Board on Health Care Services; Health and Medicine Division, 2017; National Academies of Sciences, Engineering and Medicine, 2017; National Academies of Sciences, Engineering, and Medicine 2016a, 2016b, 2016c, 2016d).

Section 3.2 Medicare Advantage, the ACA and Quality Measurement

By 2009 when Congress began debating the law that became the ACA, MA plans were paid, on average, 15% to 30% more than the cost of serving a patient in the traditional Medicare program (Altman, 2011). This payment differential was due to a variety of factors related to the bidding methodology described in the previous section and was substantially increased as a result of the previously described benchmark increases which were a part of the 2003 MMA (Altman, 2011). In addition to this payment differential, MedPAC and others expressed concerns regarding the uneven quality of care delivered by the various MA plans and the variability of available supplemental benefits (Gold, 2008; *The Medicare Advantage Program in 2014*). In crafting the ACA, Congress sought to address both these quality and cost concerns (Service Members Home Ownership Tax Act of 2009, 2009).

In February of 2007, Sen. Max Baucus (D-MT), then Chairman of the Senate Finance Committee, announced a broad outline for health care reform (Health Care Reform from Conception to Final Passage, 2010). This proposal ultimately became Senate Bill 1796 ("S 1796"), America's Healthy Future Act, which was approved by the Senate Finance Committee on October 13, 2009 (America's Healthy Future Act, 2009). With respect to the quality of MA plans, S 1796 created a bonus payment of between 0.5% and 2% of the national monthly per capita cost of expenditures for individuals enrolled in traditional Medicare to plans that offer one or more of a series of care management programs. In addition, beginning in 2014, it required the Secretary of the U.S. Department of Health and Human Services ("the Secretary")

to make monthly payments of 2% of the national monthly per capita cost for expenditures for individuals enrolled in traditional Medicare to MA plans that achieve, at least, a three-star rating and 4% to plans that achieve a four- or five-star rating. In addition, in situations in which an MA plan did not achieve three stars but CMS deemed the plan to be an improved quality plan, S1976 would have required CMS to make monthly bonus payments of 1%. S 1796 required the five-star rating system to measure clinical quality, enrollee satisfaction, and performance. In addition, it required the Secretary to risk adjust the distribution of performance bonuses under this program using the same risk-adjustment program utilized in rate setting (America's Healthy Future Act, 2009).

The Preservation of Access to Care for Medicare Beneficiaries and Pension Relief Act of 2010, House Resolution 3962 (HR 3962), was introduced by Rep. John Dingell (D-MI), Chairman of the Committee on Energy and Commerce, on October 29, 2009 (Thomas.gov, 2010). The act was renamed the Affordable Health Care for America Act, and it passed the House of Representatives on November 7, 2009 (Thomas.gov, 2010). HR 3962 created a quality-based payment adjustment applicable to MA plans. Under this legislation, the benchmarks against which plans bid would have been raised by 5% over a period of 3 years based on the plan's quality performance. HR 3962 included explicit instruction to CMS regarding how to measure quality performance. It required the Secretary to initially assess quality based on a blend of performance on the Healthcare Effectiveness Data and Information Set (HEDIS), Consumer Assessment of Healthcare Providers and Systems (CAHPS), and other measures of clinical quality as specified by the Secretary. In addition, it required CMS to include measures that reflect the outcomes of care. Those outcome measures were required, over time, to make up the preponderance of the measures. HR 3962 allowed the Secretary to risk adjust the measures as the Secretary deemed appropriate.

In early December 2009, the Senate began debate and consideration of HR 3590 (HR 3590), the Service Members House Ownership Tax Act by Representative Charles Rangel (D-NY), which had passed the House on October 8, 2009 (Service Members Home Ownership Tax Act of 2009, 2009). The contents and title of HR 3590 were amended, thereby creating the Patient Protection and Affordable Care

Act. The amendment retained the quality bonus and risk-adjustment language included in the Healthy Future Act (S1796) (*Congressional Record*, 2009).

During the course of debate on the amendment, Sen. Ron Wyden (D-OR) described the quality provisions contained in the amendment as follows:

> I had an opportunity to work closely with Chairman Baucus in terms of addressing Medicare Advantage, and I think that with the chairman's leadership, it has been possible to show you can find savings in the Medicare Program without harming older people, without reducing their guaranteed benefits, their essential benefits, as we have learned, with Medicare Advantage [. . .]. The way we have been able to do that is essentially through a two-part strategy: first, encourage competitive bidding and, second, provide incentives for quality, which is done through the bonus payment provisions that are in the legislation. First, on competitive bidding, you have plan bids, and you use the plan bids to set Medicare Advantage benchmarks which would encourage the plans to compete more directly on the basis of price and quality rather than on the level of extra benefits offered to those who are enrolling. With the competitive bidding, plans compete to be the most efficient and hold down costs [. . .]. In addition, in the Finance Committee I offered an amendment with several colleagues that would boost the payments to those plans that, according to the government—and the government uses a system of stars, in effect, to reward quality—our amendment would boost the payments to those Medicare Advantage plans with four- and five-star quality ratings. So, in effect, with our legislation there are both carrots and sticks. Competitive bidding plus bonus payments offers both, so the plans compete to provide the best value for seniors. (Service Members Home Ownership Tax Act of 2009, 2009)

On March 21, 2010, the House of Representatives concurred in the Senate amendments to HR 3590 and, along with it, passed the Health Care and Education Reconciliation Act, House Resolution 4872 (HR 4872). HR 4872 revised the benchmark and quality measurement programs, removing bonus payments for three star and improving plans, removing risk adjustment from the quality measurement methodology, and including performance on the stars quality measurement methodology in the calculation of benchmarks and rebates (Health Care and Education Affordability Reconciliation Act of 2010, 2010).

On March 24, 2010, in debate on HR 4872, Republican members of the Senate opposed the revisions as further cuts to the MA program, while Democratic Senators supported the changes as furthering efforts to improve quality. Senator Baucus, author of the America's Healthy Future Act, defended the revised provisions, stating, "[. . .] it is important to remember that health care reform will reduce excessive overpayments to Medicare Advantage plans, while at the same time rewarding high-quality, efficient plans for providing care to seniors. Medicare Advantage plans that achieve high-quality

rankings . . . will receive an increase in payments. That is very important because, today, Medicare Advantage plans are paid the same amount regardless of the quality of care they provide. For the first time, under this legislation, payments to plans would be based on performance. I think that is something all seniors would prefer" (*Consideration of the Health Care and Education Reconciliation Act of 2010*, 2010). Both bills, now known in combination as the Affordable Care Act (ACA), were presented to and signed by President Barack Obama on March 23, 2010 (Thomas.gov, 2010).

As enacted, the ACA imposed an array of reductions in MA spending (Altman, 2011; Commission, 2011), including a phased-in reduction to the benchmarks against which plans bid, and reductions in payments to account for identified patterns of differential assessment of patient health risk between MA and traditional Medicare otherwise referred to as coding intensity adjustments (The Affordable Care Act, 2010). The benchmark reductions were complete effective January 1, 2017. As a result, each county is now categorized into one of four quartiles, which range from 95% to 115% of spending in the traditional Medicare program in that county (The Affordable Care Act, 2010). In addition, each plan's benchmark and rebate amount, as well as access to bonus payments, are now contingent on quality performance (The Affordable Care Act, 2010). Despite the inclusion of risk adjustment in several earlier drafts of the legislation the ACA does not address the issue of risk adjustment of the Medicare stars program. As a result of this combination of policy changes, the ACA creates significant financial risk for plans unable to achieve quality bonus eligibility.

On October 6, 2014, President Barak Obama signed the Improving Medicare Post-Acute Care Transformation Act of 2014 (the IMPACT Act) (Improving Medicare Post-Acute Care Transformation Act of 2014, 2014). This legislation requires the Secretary to conduct a series of studies that examine the effect of individual SES on quality measures, resource use and other measures under Medicare (Improving Medicare Post-Acute Care Transformation Act of 2014, 2014).

On December 13, 2016, President Barack Obama signed HR 34, the 21st Century Cures Act (21st Century Cures Act, 2016). This law delays the ACA provisions requiring the termination of MA plans that receive fewer than three stars under the MA stars methodology for 3 years pending the results of the

IMPACT Act studies and recommendations. Specifically, it states that it is the intent of Congress to continue to study and request input on the effects of socioeconomic status and dual-eligible populations on the Medicare Advantage STARS rating system. Pending the results of those studies and stakeholder input, Section 1857(h) of the Social Security Act (42 U.S.C. 1395w–27(h)) is amended to require that "…through the end of plan year 2018, the Secretary may not terminate a contract under this section with respect to the offering of an MA plan by a Medicare Advantage organization solely because the MA plan has failed to achieve a minimum quality rating under the five-star rating system under section 1853(o)(4)" (21st Century Cures Act, 2016).

On December 21, 2016, ASPE released the first of the IMPACT Act required reports concluding that "Dually-enrolled beneficiaries, beneficiaries living in low-income neighborhoods, Black beneficiaries, rural beneficiaries and beneficiaries with disabilities experienced worse outcomes compared with other beneficiaries on many to most of the quality metrics included in the Medicare Advantage Quality Star Rating program" (*Report to Congress: Social Risk Factors and Performance Under Medicare's Value-Based Purchasing Programs*, 2016). In this report ASPE simulated a series of policy options and offered several recommendations for revising the Medicare Stars program to address the impact of social risk factors on plan performance under the Medicare Stars program (*Report to Congress: Social Risk Factors and Performance Under Medicare's Value-Based Purchasing Programs*, 2016).

Section 3.3 MA Plan Designs

MA plans can be delivered through health maintenance organizations (HMOs), local or regional preferred provider organizations (PPOs), Medicare medical savings account (MSA) plans, special needs plans (SNPs), private fee-for-service (PFFS) plans, or religious fraternal benefit (RFB) plans. Within each MA plan, enrollees may obtain care from a network of doctors, hospitals, and other health care providers. In addition, some types of MA plans offer care coordination services, such as case and disease management programs, to assist beneficiaries in navigating and obtaining access to care. Each year, Medicare defines the maximum allowable out-of-pocket cost for MA beneficiaries by service type. For

example, in 2015, CMS established the maximum deductible (the amount a beneficiary must pay before insurance coverage begins) for the drug benefit under Medicare part D at $320. In addition, total cost sharing for parts A and B services may not exceed cost sharing for those services in the traditional Medicare program on an actuarially equivalent basis (*Announcement of Calendar Year (CY) 2016 for Medicare Advantage (MA) Capitation Rates and Medicare Advantage and Part D Payment Policies and Final Call Letter*, 2015). This means that they must provide the same general level of financial protection to plan beneficiaries.

In designing the individual plan benefit packages, MA plans may require beneficiaries to pay a monthly premium, a deductible, or a portion of the cost of each service or prescription in the form of coinsurance or copayments. MA plans also typically offer additional supplemental benefits, such as dental care, vision care, or over-the-counter drugs, not available in traditional Medicare. MA plans also often have lower out-of-pocket costs compared with traditional Medicare, thereby reducing or eliminating the need for beneficiaries to purchase supplemental insurance.

Each MA plan must apply to CMS for approval to serve a designated service area. The service area is a geographic region made up of a county, multiple counties, or, in the case of a regional plan, a region designated by CMS. When approved to serve a service area, the plan must be made available to all eligible Medicare beneficiaries residing in the service area. CMS may approve a plan to serve less that an entire county within in a service area.

Section 3.4 Demographics of Medicare Advantage

As of December 2016, nearly 18.7 million Medicare beneficiaries, approximately 30% of all Medicare enrollees, receive their benefits through the Medicare Advantage (MA) program (*Medicare Advantage, Cost, PACE, Demo, and Prescription Drug Plan Contract Report - Monthly Summary Report*, 2016). Between 2009 and 2012, the number of individuals dually eligible for Medicare and Medicaid who participated in MA increased from 11% to 23% of all individuals who are dually eligible (Harrison & Zarabozo, 2014). According to MedPAC, individuals who are dually eligible represent 16% of MA

participants (Harrison & Zarabozo, 2014). This is 3% less than the share of the traditional Medicare program represented by individuals who are dually eligible (19%) (Harrison & Zarabozo, 2014).

While new Medicare enrollees were more likely to enroll in Medicare Advantage than traditional Medicare, in the years 2006-2011, dual eligibles were less likely than other Medicare beneficiaries to choose MA (Jacobson, Neuman, & Damico, 2015). However, MedPAC has found that partial dual eligibles (individuals eligible for Medicaid-funded assistance, but not full Medicaid benefits) are more likely than full dual eligibles (those entitled to full Medicaid benefits) to enroll in MA (Harrison & Zarabozo, 2014). Recent changes in policy related to dual eligibles including an ongoing federal/state demonstration program designed to enroll individuals into fully integrated MA programs (Centers for Medicare and Medicaid Services, 2014g) and state efforts to align Medicaid managed care contracts with available Duals Special Needs Plans (DSNPs) (Philip, Archibald, & Sope, 2016) likely account for a substantial proportion of the growth in enrollment of dually eligible beneficiaries in MA.

Many MA beneficiaries have low incomes. In 2012, 10.8% of MA beneficiaries had incomes less than $10,000, as compared with 12.5% of beneficiaries in traditional Medicare. Twenty-six percent of MA beneficiaries had incomes between $10,000 and $19,999, as compared to 21.1% of beneficiaries in traditional Medicare, and 21.7% of MA beneficiaries had incomes between $20,000 and $29,999, as compared with 16.7% of beneficiaries in traditional Medicare (Americas Health Insurance Plans Center for Policy and Research, 2015).

MA plans serve a higher proportion of individuals who are Hispanic and African American than the traditional Medicare program (30% in MA versus 23% in traditional Medicare). In 2012, the most recent year for which data are available, Hispanic noninstitutionalized Medicare beneficiaries represented 9.8% of all Medicare beneficiaries. However, while Hispanic noninstitutionalized beneficiaries represented 14.9% of MA beneficiaries, only 7.7% of Hispanic noninstitutionalized beneficiaries participated in traditional Medicare (Americas Health Insurance Plans Center for Policy and Research, 2015). African Americans comprised 9.8% of all Medicare beneficiaries. They represent 10.2% of MA beneficiaries as compared with 9.7% of beneficiaries served in traditional Medicare. In addition, in 2012,

57% of dual eligibles participating in MA were members of racial or ethnic minorities (Americas Health Insurance Plans Center for Policy and Research, 2015), while 47% of duals served by traditional Medicare were racial or ethnic minorities (Americas Health Insurance Plans Center for Policy and Research, 2015).

Section 3.5 Social Determinants of Health and MA

The Centers for Disease Control (CDC) defines the social determinants of health as the ". . . circumstances in which people are born, grow up, live, work, and age, as well as the systems put in place to deal with illness. These circumstances are in turn shaped by a wider set of forces: economics, social policies, and politics" (Centers for Disease Control, 2014). Examples of social determinants include access to educational, economic, and job opportunities; disparities in access to health care services; and racism, socioeconomic conditions, language, literacy, and culture (U. S. Department of Health and Human Services, 2014). Based on a meta-analysis of nearly 50 studies, researchers estimated that social factors, including education, racial segregation, social supports, and poverty accounted for over a third of total deaths in the United States in a year" (Heiman, 2015).

The sources of disparities in health care are many and varied. They include both SES factors, such as income and education; other factors, such as the **c**onditions of the community in which the patient resides, access to food and recreational facilities, proximity to environmental hazards, chronic stress, receipt of lower-quality care, more difficulty accessing care, difficulty navigating the health care system, provider ignorance or bias, provider difficulty communicating with patients, providers lacking sufficient time to spend with patients, and patient nonadherence to recommended treatment (Bahls, 2011).

Healthy People 2020, the public health goals as set under the leadership of the U.S. Department of Health and Human Services (HHS), include understanding and addressing the social determinants of health to achieve the goal of creating social and physical environments that promote good health for everyone (U. S. Department of Health and Human Services, 2014). Specifically Healthy People 2020 sets a goal of ". . . working to establish policies that positively influence social and economic conditions and

those that support changes in individual behavior, we can improve health for large numbers of people in ways that can be sustained over time. Improving the conditions in which we live, learn, work, and play and the quality of our relationships will create a healthier population, society, and workforce" (Centers for Disease, 2014). Given the demographics of MA, many MA enrollees have socioeconomic and demographic characteristics, such as high poverty, low educational attainment, poor neighborhood conditions, and exposure to racism that directly or indirectly can act as social determinants, contributing to poorer health outcomes (Braveman et al., 2011).

Section 3.6 Quality Measurement in Medicare Managed Care

The current MA stars program is used both to assist Medicare beneficiaries in selecting a plan and as a mechanism for regulators to determine benchmarks, rebates, and quality bonuses paid to the plans. The MA stars measure set rates plans based on process of care, patient outcome, experience of care, and access to care measures (*Medicare 2017 Part C & D Star Rating Technical Notes*, 2016). However, quality measurement in Medicare is not new. Medicare health plans have been participating in quality improvement activities since 1982 (D. McIntyre, Rogers, L., Heier, E.J., 2001). Medicare+Choice plans began submitting HEDIS data in 1996 (Emergency Clearance: Public Information Collection Requirements, 1996). They began participating in CAHPS in 1996 and in the Medicare Health Outcomes Survey (HOS) in 1998 (McIntyre, Rogers, & Heier, 2001).

Medicare drug plans (part D plans) have been subject to quality measurement since their inception (American Pharmacists Association and Academy of Managed Care Pharmacy, 2014). The MMA created the Medicare prescription drug benefit (part D) and required the Secretary to provide consumers with comparative information, including comparisons of quality and performance and the results of consumer satisfaction surveys (The Medicare Prescription Drug, Improvement and Modernization Act of 2003, 2003). In addition, it required each MA plan sponsor to have an ongoing quality improvement program and required each MA plan sponsor to collect, analyze, and report ". . . data that permits the measurement of health outcomes and other indices of quality" (The Medicare Prescription

Drug, Improvement and Modernization Act of 2003, 2003). Medicare initially graded part D plans using a scale of one to three stars. (Pharmacy, 2014) Medicare has been rating the quality of part D plan using a system of one to five stars since 2007 (*Medicare Part D Performance Metrics Technical Notes November 9, 2006*, 2006; Pharmacy, 2014; *Statement by Kerry Weems Acting Administrator CMS Centers for Medicare & Medicaid Services on Medicare Advantage Increased Spending Relative to Medicare Fee-for-Service*, 2008) and MA and MA-PD plans since 2008 (*Medicare Health Plan Quality and Performance Ratings Technical Notes 11/01/2007*, 2007). The Medicare stars measurement program in its current form began in 2008.

Section 3.7 The Impact of the ACA and Subsequent Policy Making on the MA Stars Program

As discussed, according to CMS, prior to the passage of the ACA, MA plans were paid on average 114% of the cost of serving the same beneficiary in the traditional Medicare program (Cavanaugh, 2016). This inequity which had been a concern of liberals throughout the life of the MA program was substantially exacerbated as a result of the MMA which raised the benchmarks in counties with low costs in the traditional Medicare program (Altman, 2011). As discussed, the ACA sought to address this payment inequity and to address concerns regarding uneven plan quality, and positive risk selection by among plans (Commission, 2009; Nicholas, 2009). To do so, the ACA modified Section 1853 of the Social Security Act (Payments to Medicare+Choice Organizations, 2010), changing the methodology used to pay MA plans and placing a substantial portion of plan compensation at risk based on plan performance under MA stars quality rating system. In 2016 MedPAC estimated that, the benchmark or maximum amount that Medicare will pay an MA plan, including the quality bonus dollars, in 2017 will amount to 107% of traditional Medicare and that, on average, plans will actually be paid 102% of what CMS spends for each participant in the traditional Medicare program (Commission, 2016). This difference likely reflects a combination of lower bids and variable stars performance impacting both bonus and rebate eligibility among plans.

Under Section 3202 of the ACA, ". . . quality rating for a plan shall be determined according to a five-star rating system . . . ." (The Affordable Care Act, 2010). Plans that score 3.5 or more Medicare stars receive a higher premium amount. This percentage increase in premium grows as performance under the five-star system increases (3.5, 4, 4.5, and 5). The law also allows plans to "earn" as much as a 5% bonus for achieving five Medicare stars. This bonus revenue must be used for providing extra benefits or lowering premiums for enrollees. Moreover, CMS has the authority to terminate plans that fail to achieve three Medicare stars for three consecutive years (Termination of Contract by CMS, 2005), a provision temporarily suspended by Congress in December 2016 under the 21st Century Cures Act (21st Century Cures Act, 2016).

Under the law, in calendar year 2012, plans achieving four or more stars were eligible to receive a 1.5% bonus in 2012, a 3% bonus in 2013, and a 5% bonus in 2014 and subsequent years. To allow plans time to improve their quality scores prior to the imposition of the full bonus program, CMS created a transitional financing program called the Quality Bonus Demonstration program (Centers for Medicare Medicaid Services, 2010). Under this program, plans that achieved three or more Medicare stars received bonus payments. The quality bonus demonstration program ended on December 31, 2014. As a consequence, results for the 2015 plan year (based on 2014 performance) were the first under the full force of the ACA provisions. As a consequence, the quantitative analysis included as phase 2 this study focuses on changes, if any, made between 2014 and 2015 on plan service areas and product filings.

In addition to the changes related to the MA stars program, the ACA sought to align MA and traditional Medicare rates. According to CMS, the ACA cut $68 billion by "Reducing excessive Medicare payments to private insurers who operate in Medicare Advantage" (CMS, 2012). To do so, Congress established a new methodology for calculating the MA county benchmark rates against which plans annually bid. To smooth this transition, a blended benchmark was used during a transition period from 2011 to 2017 (The Affordable Care Act, 2010). In 2017 (Commission, 2016), counties in all fifty states and the District of Columbia were assigned by CMS to benchmark quartiles, ranging from 95% to 115% of traditional Medicare in the most recent year in which the rates were rebased.

Additional changes included in the ACA, as well as subsequent legislation, have further increased the financial pressure on MA plans. For example, the ACA imposed a non-tax-deductible fee on most health plans, including MA. The actuarial firm Milliman has estimated the impact of that fee to be between 1.7% and 3% of plan revenue (Doucet & Yahnke, 2013; Swanson & Goetsch, 2015). However, the Consolidated Appropriations Act of 2016, Division Q, Title II, Section 201 suspended this fee for the 2016 calendar year which would be paid by plans in 2017 (Consolidated Appropriations Act of 2016, 2015).

CMS has also used its regulatory authority to increase the relative importance of the MA Star scores. Star scores are widely publicly reported on the Medicare plan finder (online enrollment) website and elsewhere to aid in consumer plan selection (Medicare Plan Finder, 2017). Plans deemed persistently low-performing (fewer than three stars for 3 years) are so noted on that website (receiving what is referred to as a low-performing icon) and are unable to receive online enrollment. In addition, Medicare beneficiaries are allowed to switch to plans earning five stars at any point in the calendar year, while lower performing plans are restricted to the annual open enrollment period (*Medicare 2017 Part C & D Star Rating Technical Notes*, 2016; *Report to Congress: Social Risk Factors and Performance Under Medicare's Value-Based Purchasing Programs*, 2016).

In addition to the changes made in the ACA and subsequently by CMS, the American Taxpayer Relief Act of 2012 (ATRA) ("American Taxpayer Relief Act of 2012," 2013), and subsequent CMS regulations reduced MA rates to reflect differences in risk coding between health plans and traditional Medicare (known as a coding intensity adjustment) (Centers for Medicare and Medicaid Services, 2014a). In April 2013, Congress imposed a 2% “sequestration” across the board to cut all of Medicare, including MA (2014). For the 2017 plan year CMS modified this same risk-adjustment methodology in an effort to more appropriately compensate plans serving sicker and more disabled beneficiaries. This had the effect of further reducing revenue to some MA plans (*Announcement of Calendar Year (CY) 2016 for Medicare Advantage (MA) Capitation Rates and Medicare Advantage and Part D Payment Policies and Final Call Letter*, 2015; *Announcement of Calendar Year (CY) 2017 Medicare Advantage Capitation Rates and*

Medicare Advantage and Part D Payment Policies and Final Call Letter, 2016; Centers for Medicare and Medicaid Services, 2014a). In a report created for the MA trade group The Better Medicare Alliance describing the cumulative impact of these changes, the actuarial firm Milliman estimated that while average annual premiums paid to MA plans between 2012 to 2015 increased by $18.96, the annual "benefit value" (meaning the extra benefits received by MA participants but not available to beneficiaries in traditional Medicare, such as reduced cost sharing and supplemental benefits) fell by $132.72 (Swanson & Goetsch, 2015).

The combination of reimbursement changes required by the ACA and subsequent legislation, as well as the threat of contract termination for repeated low stars performance, has created an imperative for MA plans to achieve high Medicare stars scores in order to obtain the bonus revenue necessary to ensure their products remain financially viable. For the 2015 plan year, the consulting firm McKinsey estimated that plans with fewer than four stars would forgo $3.47 billion in bonus payments (Carlton, Ladsariya, & Machado-Pereira, 2014). For the 2016 plan year, because more plans were able to achieve bonus eligibility and more beneficiaries joined MA plans with four or more stars, that number dropped to a still substantial $2.03 billion (Hurley, Ladsariya, Machado-Pereira, & Vaskov, 2015; *Medicare Payment Advisory Commission Public Meeting*, 2015). Simply dividing that number by the total number of beneficiaries participating in plans below four stars, the revenue lost by a plan failing to achieve four stars in 2016 was $362.5 per beneficiary.

Section 3.8 Medicare Advantage Stars Methodology

Each year CMS establishes the set of measures under which each plan will be scored in the following year. In making changes from year to year, CMS states, "Our priorities include enhancing the measures and methodology to reflect the true performance of organizations and sponsors, maintaining stability to the link to payment, and providing advance notice of future changes" (*Advance Notice of Methodological Changes for Calendar Year (CY) 2015 for Medicare Advantage (MA) Capitation Rates,*

Part C and Part D Payment Policies and 2015 Call Letter, 2014). Despite this stated goal, the type and magnitude of changes made from year to year are not consistent.

The inconsistency manifests in several ways. First, some of the measures included in the scoring methodology in one year are not included in the next year. Second, the weight applied to the measure can change from year to year. For example, each measure receives a weight of one in the scoring methodology in the first year that it is a part of the methodology, but that weight can be increased over time. Third, the organizations that promulgate the measures used in the methodology, (such as CMS or the National Committee on Quality Assurance (NCQA)) can change each measure's parameters from year to year.

Phase 2 of this study focuses on the transition from the quality bonus demonstration program to the full effect of the stars methodology required under the ACA which occurred on January 1, 2015. Using this transition as an example, between 2014 and 2015 four MA stars measures were changed as a result of changes in NCQA's HEDIS specifications: one measure was moved to the display page; one measure was retired (removed entirely); the specifications for four measures implemented by CMS were changed; and CMS changed the scoring methodology to increase the weight of the summary measure of year-over-year improvement (*Advance Notice of Methodological Changes for Calendar Year (CY) 2015 for Medicare Advantage (MA) Capitation Rates, Part C and Part D Payment Policies and 2015 Call Letter*, 2014). A table created by the Centers for Medicare and Medicaid Services that lists the measures included in the methodology by year from 2008 to 2016 is included as Appendix H (CMS, 2014a).

The measures included in the MA stars methodology are derived from four sources: HEDIS, CAHPS, HOS and CMS administrative data. HEDIS is a measurement tool developed by the NCQA and used by Medicare, Medicaid, and commercial health plans to assess plan performance according to specific domains of care: effectiveness of care, experience of care, access/availability of care, utilization, and relative resource use (National Committee for Quality Assurance, 2014; National Committee on Quality Assurance). CAHPS surveys are designed by the Agency for Healthcare Research and Quality (AHRQ) for the purpose of measuring patients' experiences of care (Agency for Healthcare Research and

Quality, 2014). Since 2011, CMS has required MA and part D contracts with more than 600 members to administer a plan-specific CAHPS survey. The survey includes six composite measures: getting needed care, getting care quickly, doctors who communicate well, health plan customer service, getting needed prescription drugs, and getting information from the health plan regarding prescription drug coverage and cost (Quality, 2014). HOS evaluates patient-reported outcomes based on a random sample of each MA plan's participants. Developed by CMS, NCQA, Health Assessment Lab (HAL), and other experts, the HOS survey has been used since 1998. The current version of HOS (v.3.0) contains questions regarding health status, physical and mental health outcomes, questions on impairments in activities of daily living, four HEDIS effectiveness of care measures, and demographic questions regarding race, ethnicity, primary language, sex, and disability status as required under the Affordable Care Act. HOS is administered to a random sampled of 1200 MA participants from each MA organization with more than 500 enrollees. Two years later the same respondents are surveyed again. For example, the 2016 administration of the HOS survey administered the initial survey to HOS cohort 19 and the resurvey to cohort 17 who were initially surveyed in 2014 (Health Services Advisory Group, 2014). CMS administrative data include information about member satisfaction, plans' appeals processes, audit results, and customer service.

The MA stars methodology measures the MA plan's performance against each measure in the year before the plan receives its score. That score then applies for the subsequent year. For example, the 2015 plan year score (the score that beneficiaries saw when shopping for a plan for the calendar year 2015) was received by each plan in 2014. That score was a measure of the plans' performance under the 2015 stars methodology using 2013 data.

Plans are given ratings by domain of care, part C and part D summary score, and an overall summary rating of between one to five Medicare stars. The summary rating is derived from all four data sets. In 2014, the total measure set included 48 measures. Of those measures, 31 made up approximately 61% of a health plan's overall star score (Medicare.gov, 2014). Twenty measures, 39% of the overall score, were based on CMS and other administrative data sources, including data, such as call center reports, complaint and appeals reports, and disenrollments (Medicare.gov, 2014).

Each clinical measure includes specifications (a numerator and denominator of patients) and clinical exclusions. For the 2014 plan year, in addition to clinical specifications, nine measures (18.8%) each of which come from the CAHPS and HOS surveys were adjusted to account for some SES attributes of the measured population, including age, race, education, income, and dual status. Only one measure, plan all-cause readmissions, was adjusted for clinical comorbidities (Medicare.gov, 2014). This unique measure, plan all-cause readmissions, calculates the percentage of acute inpatient stays during a given year that were followed by an acute readmission for any reason within 30 days of discharge. The formula used to calculate this measure divides the actual (observed) readmission rate by an expected readmission rate (a weighted average for each of three age bands: 65-74, 75-84, and 85+) and then multiplies this result by the national average observed rate (Centers for Medicare Medicaid Services, 2014).

Section 3.9 Socioeconomic Status and Other Demographic Factors and MA Stars

Whether and how to measure—and pay for—quality in health care has long been debated (McIntyre, Rogers, & Heier, 2001). As the financial impact of performance under CMS's various quality measurement systems has increased, policy makers, researchers, regulators, and providers have offered a variety of opinions regarding the impact that these factors have on quality measure performance (Joynt & Jha, 2012) and whether and how to account for SES and other demographic factors in this context. Some commentators have recommended including an adjustment for SES (Atkinson & Giovanis, 2014; Berenson, 2013; Girotti, Shih, & Dimick, 2014; Joynt & Jha, 2013a; *Report to Congress: Social Risk Factors and Performance Under Medicare's Value-Based Purchasing Programs*, 2016), stratifying performance results (Bernheim, 2014; Stensland, Lisk, & Glass, 2013), measuring improvement as opposed to achievement on certain measures (Berenson, Paulus, & Kalman, 2012; Bhalla & Kalkut, 2010), creating measures specific to safety-net providers (Chatterjee, Joynt, Orav, & Jha, 2012), and changing the underlying measure specifications (Girotti et al., 2014; Joynt & Jha, 2013a). Others have opposed adjustments based on concerns that adjustments may not have a meaningful impact on results (Bernheim, 2014; Frakt, 2013) and could mask existing health disparities (Kertesz, 2014). Additional

concerns with adjustment focus on the concern that disparities in outcomes for low SES patients stem from lower quality patient care rather than patient factors (Bernheim, 2014; Kertesz, 2014). One commentator questioned the overall validity of the hospital readmissions measure by citing economic disadvantage as a potential confounder (Axon, 2011).

An expert panel appointed by the National Quality Forum (NQF) issued a report in the spring of 2014 recommending that certain quality measures be risk adjusted to account for sociodemographic differences, in addition to differences based on health status (National Quality Forum, 2014b). In a follow up to that report and based on recommendations from the NQF Consensus Standards Approval Committee, the Board of Directors of NQF ratified a trial to assess the impact of risk adjusting certain measures for sociodemographic factors (National Quality Forum, 2014a).

The decision was controversial. In fact, in their response to the draft recommendations, CMS stated,

> Currently, CMS does not adjust quality outcome measures for patient socio-economic status (SES) because of the concern that doing so would establish a different standard of care for providers based on the socioeconomic status of the patients they care for, and can mask disparities in the quality of care provided [. . .]. Risk adjustment of quality measures for SES may reduce incentives to achieve high quality clinical goals for the economically disadvantaged. Previous analyses have shown that in some cases patients with low SES do concentrate in providers, hospitals, and plans that provide lower quality of care to all patients, so adjusting for this patient characteristic could adjust away true differences in quality across plans [. . .]. In addition, evidence was provided at the steering committee meetings that many providers who care for large proportions of low SES and disadvantaged patients are able to achieve high quality care. Such evidence should be recognized in the report as counter-argument to risk adjustment for SES; an argument that was discussed at length during the steering committee deliberations (Centers for Medicare and Medicaid Services, 2014b).

In their final report, issued August 15, 2014, the NQF expert panel recommended sociodemographic adjustments be made to measures used for comparative assessment under certain conditions. However, if a measure is adjusted for sociodemographic factors, the measure must also be reported on a stratified basis in order to make health disparities visible (National Quality Forum, 2014b). The NQF Consensus Standards Approval Committee recommended, and the NQF Board of Directors approved, a trial period during which the NQF restriction against adjustment would be lifted and tested to generate data to inform permanent policy on this issue (National Quality Forum, 2014c, 2014d). On

September 3, 2014, the Consensus Standard Approval Committee adopted parameters for the trial. During that period, the NQF policy which restricts the use of sociodemographic factors in statistical risk models used in quality measurement is suspended only if (1) the Standing Committee approves the use of SES factors for that individual measure; (2) there is a conceptual and empirical basis for the adjustment; and (3) measure developers include both stratification of an adjusted and unadjusted version of the measure. During the trial, if adjustment is deemed appropriate, the NQF requires that each measure have specifications to compute the adjusted results, the nonadjusted result and stratification of the nonadjusted version in order to expose disparities (National Quality Forum, 2014d). Measure promulgators were given until April 1, 2015, to submit measures for participation in the pilot program. On April 7, 2015, a memorandum was issued by staff at the NQF outlining parameters for the trial period, a time line for further activity, and evaluation criteria (Burstin, Amin, & Isijola , 2015).

In September 2014, CMS used their regulatory discretion not to terminate plans that scored fewer than three Medicare stars for three consecutive years and issued a request for information regarding differences in star rating performance among plans serving individuals who are dually eligible for Medicare and Medicaid and those who are only eligible for Medicare (Centers for Medicare and Medicaid Services, 2014f). Responses to that RFI were due November 3, 2014.

On October 6, 2014, during the CMS comment period, President Obama signed into law the Improving Medicare Post-Acute Care Transformation Act of 2014 (the IMPACT Act) (Improving Medicare Post-Acute Care Transformation Act of 2014, 2014). This law primarily addresses quality and payment for post-acute care in traditional Medicare. It also includes a provision requiring the Secretary to conduct a series of studies that examine the effect of individuals' SES on quality measures, resource use and other measures for individuals under Medicare. It requires the Secretary to report to Congress not later than two years from the enactment of the Act (Improving Medicare Post-Acute Care Transformation Act of 2014, 2014). On March 23, 2015, HHS issued a notice of intent to award a single source contract to the National Academy of Medicine (NAM)/National Research Council to conduct a study to:

1. Define SES;
2. Identify the best practices of high-quality providers who serve disproportionate shares of low SES patients;
3. Identify SES factors that impact the health outcomes of Medicare beneficiaries;
4. Establish a set of criteria to be used to determine whether an SES factor should be accounted for in Medicare payment programs; and
5. Suggest data sources and strategies for collecting needed data on SES factors for incorporation into Medicare payment programs.

(*Accounting for Socioeconomic Status in Medicare Payment Program*, 2015)

These studies examined the impact of SES factors not only at MA and part D but also on other Medicare quality measurement programs including the Medicare Hospital Readmission Reduction Program, the Medicare Hospital Value Based Purchasing Program, the Medicare Hospital Acquired Condition Payment Reduction, the Physician Value Based Modifier Program, the Medicare Shared Savings Program (ACOs), End Stage Renal Disease Quality Incentive Program, and the Post-Acute Care Value-Based Purchasing Program. (*Accounting for Socioeconomic Status in Medicare Payment Program*, 2015).

On February 20, 2015, CMS issued the *Advance Notice of Methodological Changes for Calendar Year (CY) 2016 for Medicare Advantage (MA) Capitation Rates, Part C and Part D Payment Policies and 2016 Call Letter* (*Advance Notice of Methodological Changes for Calendar Year (CY) 2016 for Medicare Advantage (MA) Capitation Rates, Part C and Part D Payment Policies and 2016 Call Letter*, 2015) (The Advance Notice). For the first time, CMS substantially addressed the issue of differential performance on the stars ratings program between plans with high and low proportions of individuals with low SES. They announced that, while they planned to continue studying the issue, they proposed to change the stars methodology for all plans regardless of the proportion of LIS/dual membership by reducing the weight of seven targeted measures by 50% (*Advance Notice of Methodological Changes for Calendar Year (CY) 2016 for Medicare Advantage (MA) Capitation Rates, Part C and Part D Payment*

Policies and 2016 Call Letter, 2015). They proposed to de-weight the following measures: Breast Cancer Screening, Colorectal Cancer Screening, Diabetes Care-Blood Sugar Controlled, Osteoporosis Management in Women Who Had Fracture, Rheumatoid Arthritis Management, Reducing Risk of Falling and only for part D plans, and Medication Adherence for Hypertension in part D plans (PDP) only ((*Advance Notice of Methodological Changes for Calendar Year (CY) 2016 for Medicare Advantage (MA) Capitation Rates, Part C and Part D Payment Policies and 2016 Call Letter*, 2015). These measures were chosen on the basis of "statistical and practical significance" (*Advance Notice of Methodological Changes for Calendar Year (CY) 2016 for Medicare Advantage (MA) Capitation Rates, Part C and Part D Payment Policies and 2016 Call Letter*, 2015) Specifically, CMS said, "The reduced weights will target immediate relief to plans with significant Duals/LIS enrollment while maintaining incentives for all plans to improve on these important measures. Given the uncertainty about what is driving the association, long-term adjustments should be based on further in-depth examination of the issue by CMS and it HHS partners in quality measurement, as well as external measure developers, to determine the driving factors for the difference that has been observed in the preliminary research and RFI submissions" (*Advance Notice of Methodological Changes for Calendar Year (CY) 2016 for Medicare Advantage (MA) Capitation Rates, Part C and Part D Payment Policies and 2016 Call Letter*, 2015)

This proposal would have reduced the effect of the chosen measures on the overall stars calculation, while increasing the weight and significance of other, more heavily weighted measures. This proposal met with substantial stakeholder resistance, and on April 6, 2015, when CMS issued their *Announcement of Calendar Year (CY) 2016 Medicare Advantage Capitation Rates and Medicare Advantage and Part D Payment Policies and Final Call Letter*, they reversed course (*Announcement of Calendar Year (CY) 2016 for Medicare Advantage (MA) Capitation Rates and Medicare Advantage and Part D Payment Policies and Final Call Letter*, 2015). Citing the results of their internal research, information obtained in response to the RFI, and comments received in response to the *Advance Notice*, they concluded,

> Given the uncertainty about what factors are driving the associations observed in the preliminary research, further in-depth examination by CMS, our HHS partners, MAOs, and Part D sponsors in quality measurement, as well as external measure developers, is warranted. The goal of the research is to provide the scientific evidence as to whether sponsors that enroll a disproportionate number of Dual/LIS beneficiaries are systematically disadvantaged by the Star Ratings and, if so, how such sponsors are disadvantaged (e.g. to identify specific quality measures) and to what extent they are disadvantaged. We recognize that the solution must acknowledge the unique challenges of serving traditionally underserved subsets of the population. The original request from some industry representatives was that certain quality measures be adjusted for the SES of their enrollees. The nature of such a statistical adjustment is that some plans would benefit, while others would experience lower measured performance. We note that a number of proposals submitted by the industry during the comment period were not consistent with this approach and were not budget neutral. In addition, we must be cognizant that the policy response must adequately address the unique situations in the territories. Upon completion of additional research, adjustments for the 2017 Star Ratings or other appropriate adjustments would be proposed in the fall Request for Comments. Depending on the research findings, solutions could include case-mix adjustments, different weighting options, excluding certain measures, or payment solutions. As we continue to explore this important issue, we will continue to be transparent and welcome collaboration with all stakeholders (*Announcement of Calendar Year (CY) 2016 for Medicare Advantage (MA) Capitation Rates and Medicare Advantage and Part D Payment Policies and Final Call Letter*, 2015).

In addition, in that same notice, CMS confirmed their intent to terminate any remaining contracts that scored fewer than three stars for three years in either Medicare part C or part D (*Announcement of Calendar Year (CY) 2016 for Medicare Advantage (MA) Capitation Rates and Medicare Advantage and Part D Payment Policies and Final Call Letter*, 2015).

In 2015, in support of ASPE's work on this issue, the NAM convened an ad hoc committee to provide a definition of SES for the purposes of application to Medicare quality measurement and payment programs, to identify the social factors that have been shown to impact health outcomes of Medicare beneficiaries, and to specify criteria that could be used in determining social factors that should be accounted for in Medicare quality measurement and payment programs.

In 2015, CMS engaged the RAND Corporation to look at both the effect of low-income and disability status on MA plan performance on 16 clinical quality measures: adult BMI assessment, rheumatoid arthritis management, breast cancer screening, controlling blood pressure, diabetes care – blood sugar controlled, diabetes care—eye exam, diabetes care—kidney disease monitoring, colorectal cancer screening, osteoporosis management in women who have had a fracture, plan all-cause readmissions, annual flu vaccine, monitoring physical activity, reducing the risk of falling, medication

adherence for diabetes medications, medication adherence for hypertension, and medication adherence for cholesterol (Centers for Medicare and Medicaid Services, 2015a, 2015b) . These measures were selected based on a process of elimination: CAHPS and HOS measures were excluded because some of the measures included in HOS and CAHPS are already case mix adjusted for some beneficiary attributes, plan-level (versus beneficiary-level) measures were excluded because they measure plan performance (call center, part D price accuracy, etc.), and measures either due to be retired or revised or measures that were only applicable to special needs plans were also excluded (Centers for Medicare and Medicaid Services, 2015a, 2015b).

Looking at the differences between contracts, CMS found that vulnerable beneficiaries were less likely than nonvulnerable beneficiaries to receive the recommended care or outcome although, for a small subset of measures, they got better care (Centers for Medicare and Medicaid Services, 2015a, 2015b). They also concluded that more measures demonstrated a positive association with disability as compared to LIS/DE (Centers for Medicare and Medicaid Services, 2015a, 2015b). However, when they looked at the differences within contracts (in the same contract, one person is LIS/DE or disabled and another is not) the majority of the measures had a small, negative within-contract difference or no difference (Centers for Medicare and Medicaid Services, 2015a, 2015b).

Despite the fact that a causal link between SES factors and quality performance still had yet to be proven, based on RAND's research, on November 12, 2015, CMS released their request for comments on the proposed 2017 stars methodology. In it they offered for comment two proposed interim adjustment methodologies: application of a categorical adjustment index (CAI) and the use of indirect standardization (IS) (Larrick, 2015).

In that November 12, 2015 guidance, CMS stated that the stars methodology itself should not be modified to address between contract differences in stars performance but that these proposed adjustments were being offered based on what the agency characterized as their commitment to accurate measurement of quality care and their view that the issues of quality and payment need to be disaggregated (Larrick, 2015). In that same proposal, CMS encouraged the measure stewards to review

each of their measure specifications with an eye to the issue of low-income status and disability (Larrick, 2015).

Following through on this guidance, for the 2017 plan year, CMS moved forward with their plans to both address the accuracy of the stars measurement system and to disaggregate the issues of quality measurement and equity of payment to plans caring for large numbers of low SES Medicare beneficiaries participating in MA. They did this by making substantial revisions to the MA risk-adjustment methodology and by implementing the CAI. With respect to the risk adjustment methodology, they increased the risk scores (and therefore the rate of payment to plans) for full benefit dual eligibles (individuals eligible for Medicare and Medicaid), and decreased the risk score of other Medicare beneficiaries (*Announcement of Calendar Year (CY) 2017 Medicare Advantage Capitation Rates and Medicare Advantage and Part D Payment Policies and Final Call Letter*, 2016). The CAI was implemented as a factor added to or subtracted from a contract's overall and/or summary 2017 star rating to adjust for the average within-contract performance disparity based on the contract's proportion of LIS/DE or disabled members (*Announcement of Calendar Year (CY) 2017 Medicare Advantage Capitation Rates and Medicare Advantage and Part D Payment Policies and Final Call Letter*, 2016). Each MA contract received up to three CAI adjustments at the overall and summary levels. PDPs received one adjustment for the part D summary rating (*Announcement of Calendar Year (CY) 2017 Medicare Advantage Capitation Rates and Medicare Advantage and Part D Payment Policies and Final Call Letter*, 2016). Contracts were categorized based on their percentages of LIS/DE and disabled beneficiaries, and the CAI value was the same for all contracts within each adjustment category. The CAI calculation for MA and part D plans was performed separately (*Announcement of Calendar Year (CY) 2017 Medicare Advantage Capitation Rates and Medicare Advantage and Part D Payment Policies and Final Call Letter*, 2016).

In applying the CAI for 2017, CMS used a subset of the measures included in the RAND study: Breast Cancer Screening, Colorectal Cancer Screening, Diabetes Care – Blood Sugar Controlled, Osteoporosis Management in Women who had a Fracture, Rheumatoid Arthritis Management, and

Reducing the Risk of Falling. In addition, Medication Adherence for Hypertension (RAS antagonists) will be included for MA-PD and part D plans (*Announcement of Calendar Year (CY) 2017 Medicare Advantage Capitation Rates and Medicare Advantage and Part D Payment Policies and Final Call Letter*, 2016; *Medicare Part C & D Star Ratings: Update for 2017: August 3, 2016 Part C & D User Group Call* 2016).

Because the CAI is an interim adjustment each year, CMS will annually announce whether it intends to continue to apply it after 2017. (*Announcement of Calendar Year (CY) 2017 Medicare Advantage Capitation Rates and Medicare Advantage and Part D Payment Policies and Final Call Letter*, 2016) Each year, prior to applying a CAI, CMS will request comments about the subset of measures to be included for adjustment using the CAI (*Announcement of Calendar Year (CY) 2017 Medicare Advantage Capitation Rates and Medicare Advantage and Part D Payment Policies and Final Call Letter*, 2016). The CAI values will be released in the final Call Letter and included in the annual Stars Technical Notes (*Announcement of Calendar Year (CY) 2017 Medicare Advantage Capitation Rates and Medicare Advantage and Part D Payment Policies and Final Call Letter*, 2016). The CAI values will be determined using the previous rating year's measurement period (*Announcement of Calendar Year (CY) 2017 Medicare Advantage Capitation Rates and Medicare Advantage and Part D Payment Policies and Final Call Letter*, 2016).

Between October 2015 and January 2017, pursuant to a contract with ASPE, the NAM Committee on Accounting for Socioeconomic Status in Medicare Payment Programs convened in 2015 released a series of five reports. Those reports redefined socioeconomic status as "social risk factors" (National Academies of Sciences, 2016a), conducted a literature review and examined 60 case studies submitted on best practices in serving populations with social risk factors (National Academies of Sciences, Engineering, and Medicine 2016d), defined criteria, factors and methods to account for social risk factors in Medicare payment (National Academies of Sciences, Engineering, and Medicine 2016a), identified current and potential data sources that could be used to account for social risk factors in Medicare payment (National Academies of Sciences, Engineering, and Medicine 2016b) and made a

series of recommendation to HHS regarding the various methods of accounting for social risk factors (National Academies of Sciences, 2017).

On December 13, 2016, President Barack Obama signed HR 34, the 21st Century Cures Act (21st Century Cures Act, 2016). This law requires CMS to evaluate the results of the IMPACT Act required studies, to obtain stakeholder feedback on those studies and prohibits CMS from terminating MA plans prior to the end of plan year 2018 solely because they have failed to achieve a minimum quality rating under the five-star rating system under section 1853(o)(4) (21st Century Cures Act, 2016).

Most recently, on December 21, ASPE released the first of the IMPACT Act required reports on the effect of socioeconomic status on performance under the Medicare quality measurement programs. Leveraging the work of the NAM committee, the ASPE report models the impact of social risk factors on performance under Medicare's value based purchasing programs including the Medicare Stars program. The report concludes that there is a relationship between social risk and performance under the MA Stars methodology both between contracts serving high and low proportions of beneficiaries with social risk factors and within the contracts themselves. The report identifies and models a series of policy options for addressing this performance differential and makes a series of recommendations for revision to the Medicare Stars program (*Report to Congress: Social Risk Factors and Performance Under Medicare's Value-Based Purchasing Programs*, 2016).

CHAPTER 4: PURPOSE AND AIMS

The purpose of this study is to more fully understand the implications of the post-ACA Medicare stars quality measurement methodology so as to answer two research questions:

1. What impact, if any, has the post-ACA MA stars methodology had on the products and services offered by Medicare Advantage plans serving socially and economically vulnerable Medicare beneficiaries?
2. What steps can and should policy makers and organizational leaders take to offset SES-related barriers, if any, to high performance under the MA stars methodology by plans serving high proportions of low SES members?

The study has four aims:

1. To conduct key informant interviews to provide a qualitative analysis of the impact of SES characteristics on quality measure performance, what can be done to off-set the impact, and what, if any, changes to the measure set and/or methodology are needed to effectively address the methodological impact of these SES differences on quality measure performance;
2. To conduct a statistical analysis of plan benefit packages to examine the difference, if any, in benefit design among plans with varying proportions of low-income members;
3. To carry out a policy analysis of potential strategies to enhance any positive consequences and ameliorate any negative consequences identified in aims 1 and 2; and
4. To develop a plan for change to improve MA quality and access based on data gathered in aims 1-3, if any.

CHAPTER 5: REVIEW OF THE LITERATURE

Section 5.1 Research Question and Rationale

The Medicare program measures the quality of health plans and hospitals based on a series of quality measures. However, few of these measures are adjusted to account for patient SES characteristics. Thus, this review of the literature poses the following question: What impact do patient/member SES characteristics have on plan and hospital performance on measures included in the Medicare stars quality program?

Section 5.2 Methods

This literature review examines the existing research on the impact of SES variables, such as race, income, gender, and educational attainment, on measures of plan performance and on hospital readmissions. Hospital readmissions are used as a measure of quality under both the Medicare stars program and the quality programs applied to hospitals in the traditional Medicare program. While not identical, they are quite similar and offer a robust additional source of information on the impact of socioeconomic status characteristics on quality performance. Health plans began submitting CAHPS and HEDIS data to CMS (then the Health Care Financing Administration (HCFA)) in 1996. As a result, the time period for articles reviewed is 1997 to present. Each article includes Medicare beneficiaries in the study populations. All articles are in English. PDFs of the relevant articles were downloaded to a Google drive, and references were saved in EndNoteX7. A description of the characteristics of the included studies is included as Appendix D.

To capture the largest possible universe of articles, I performed several searches using PubMed and one using Google Scholar (see Table 2). Literature recommendations were obtained from professional colleagues, and additional articles referenced in relevant literature were reviewed using a snowballing

technique. In addition, daily Google and NCBI alerts were established to identify newer or overlooked articles.

Table 2. PubMed and Google Scholar literature searches

Search terms	Database	Article yield
Healthcare effectiveness data and information set OR HEDIS AND Medicare	PubMed	81
Healthcare effectiveness data and information set OR HEDIS AND Medicare Advantage	PubMed	18
Healthcare effectiveness data and information set OR HEDIS AND Medicare AND social determinants of health	PubMed	0
Healthcare effectiveness data and information set OR HEDIS AND Medicare AND socioeconomic	PubMed	11
Healthcare effectiveness data and information set OR HEDIS AND Medicare AND race	PubMed	13
Healthcare effectiveness data and information set OR HEDIS AND Medicare AND income	PubMed	27
Healthcare effectiveness data and information set OR HEDIS AND Medicare AND breast cancer	PubMed	9
Healthcare effectiveness data and information set OR HEDIS AND Medicare AND cardiovascular	PubMed	5
Healthcare effectiveness data and information set OR HEDIS AND Medicare AND cholesterol	PubMed	10
Healthcare effectiveness data and information set OR HEDIS AND Medicare AND colorectal AND cancer	PubMed	2
Healthcare effectiveness data and information set OR HEDIS AND Medicare AND glaucoma	PubMed	0
Healthcare effectiveness data and information set OR HEDIS AND Medicare AND body mass index (BMI)	PubMed	0
Healthcare effectiveness data and information set OR HEDIS AND Medicare AND medication OR drug	PubMed	20
Healthcare effectiveness data and information set OR HEDIS AND Medicare AND functional status	Pubmed	3
Healthcare effectiveness data and information set OR HEDIS AND Medicare AND pain	PubMed	1
Healthcare effectiveness data and information set OR HEDIS AND Medicare AND osteoporosis	PubMed	2
Healthcare Effectiveness Data and Information Set OR HEDIS AND Medicare AND diabetes	PubMed	22
Healthcare Effectiveness Data and Information Set OR HEDIS AND Medicare AND blood AND pressure	PubMed	4
Healthcare effectiveness data and information set OR HEDIS AND Medicare AND rheumatoid arthritis	PubMed	1
Healthcare effectiveness data and information set OR HEDIS AND Medicare AND readmission	PubMed	1
Health AND quality AND measure AND socioeconomic	PubMed	409
(((quality) AND ((measure OR measures))) AND Medicare) AND Socioeconomic	PubMed	69
"((("quality measures" OR "quality measure") AND health) AND medical AND socioeconomic"	Google Scholar	23

Section 5.2.1 Inclusion Criteria

As discussed in Chapter 3, measures included in the MA stars methodology change annually. Appendix G contains a list of the measure sets from 2008 to 2016. To take the broadest view of the literature, I included articles or reports ("articles") if they examine the impact of any of the following socioeconomic and demographic characteristics: income, wealth, Medicaid eligibility, receipt of a low-income subsidy under Medicare part D, residence in a high poverty or low-income neighborhood, race/ethnicity, gender, age, or educational attainment on MA health plan performance on any quality measure for which there is or was an analogous measure included in the MA stars methodology in the year that was the subject of the study. Articles are also included if they studied hospital performance on any measure of readmission. Finally, articles are included if they present a review of the literature that met the same inclusion criteria. Appendices E and F provide the characteristics accounted for in each study.

I assessed the quality of each included study based on the following criteria:

1. Publication in a peer-reviewed journal or, if not, by a credible government or third-party source;
2. Analysis of health plan, hospital, or member/patient-level quality performance in the Medicare program; and
3. A comprehensive description of study methods, data sources, conclusions and limitations.

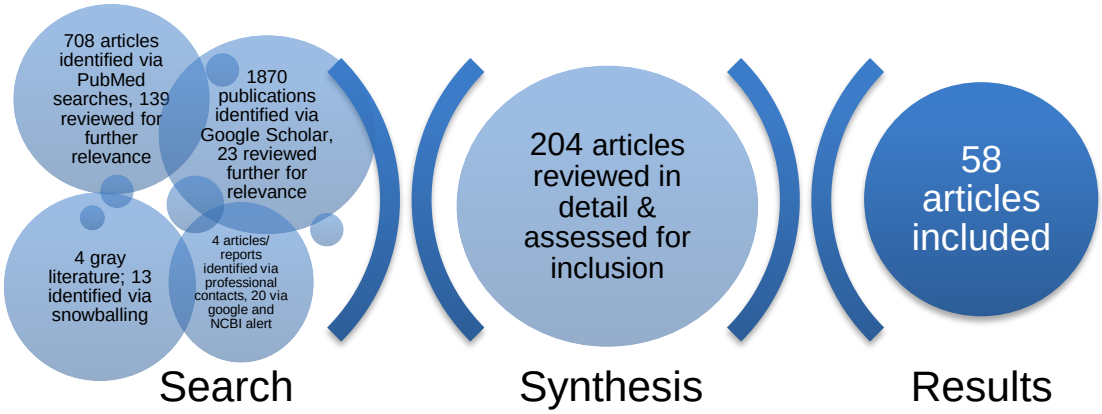
Section 5.2.2 Exclusion Criteria

This literature review excludes any article that does not meet the standards for inclusion. Additionally, because the body of literature on health disparities is enormous, this literature review excludes all articles that address the impact of SES characteristics on quality measure performance outside the Medicare program and outside of Medicare health plan and hospital quality. In addition, articles examining the impact of SES characteristics on hospital readmission are limited to those that focus on Medicare beneficiaries treated in general acute care community hospitals. As a result, articles using data derived from Veterans Administration, behavioral health, or specialty hospitals are excluded.

Section 5.2.3 Results

The PubMed searches yielded 708 articles. I reviewed each abstract of those articles for relevance. From the 708 articles identified, 139 were reviewed for further relevance. The Google Scholar search identified 1,870 relevant articles. Because Google Scholar produces relevance-weighted search results, the first 100 of 1,870 abstracts were reviewed. From among that 100, 23 were examined in detail for further relevance. Four gray literature reports authored by consulting firms were identified and accessed via the Web. Four articles and six government report were identified via professional experience, and an additional 13 were identified via snowballing. Twenty articles were identified via PubMed and Google Scholar alerts after the initial searches were performed. From the 204 articles reviewed in detail, 58 met the criteria for inclusion.

Figure 2. Article selection process



Section 5.3 Study Design

Fifty-three of the articles included in this review are descriptive, using data from secondary data source (Aranda, Johnson, & Conti, 2009; Arbaje et al., 2008a; Ayanian, Landon, Newhouse, & Zaslavsky, 2014; Ayanian, Landon, Zaslavsky, & Newhouse, 2013; Barnett, Hsu, & McWilliams, 2015; Bernheim, 2016; Bird et al., 2007; Blum et al., 2014; Brennan & Shepard, 2010; Cahow et al., 2010; Carey, 2016; Chou et al., 2007a; Couto et al., 2014; Eapen et al., 2015; Figueroa, Wang, & Jha, 2016; Fremont et al., 2005a; Greysen, Stijacic Cenzer, Auerbach, & Covinsky, 2015; Gu et al., 2014; Harman et

al., 2010; Herrin et al., 2015; Holmes, Luo, Kuo, Baillargeon, & Goodwin, 2013; Hu, Gonsahn, & Nerenz, 2014; Inovalon, 2013, 2015, 2014b; Joynt & Jha, 2013b; Joynt & Jha, 2011; Jung, Palta, Smith, Oliver, & DuGoff, 2016; Kahn et al., 2015; Kind et al., 2014; Krumholz et al., 1997, 2000; Lindenauer et al., 2013; Mahmoudi, Tarraf, Maroukis, & Levy, 2016; McBean, Huang, Virnig, Lurie, & Musgrave, 2003; McHugh, Carthon, & Kang, 2010; Nagasako, Reidhead, Waterman, & Dunagan, 2014; Priest, Buikema, Engel-Nitz, Cook, & Cantrell, 2012; Qato & Trivedi, 2013; Rathore et al., 2003a; Rathore et al., 2006; *Report to Congress: Social Risk Factors and Performance Under Medicare's Value-Based Purchasing Program*, 2016; Rodriguez, Joynt, Lopez, Saldana, & Jha, 2011; Schmajuk et al., 2011; Schneider, Zaslavsky, & Epstein, 2002; Sheingold, Zuckerman, & Shartzer, 2016; Singh, Lin, Kuo, Nattinger, & Goodwin, 2013; Trivedi, Zaslavsky, Schneider, & Ayanian, 2005, 2006; Tsai, Orav, & Joynt, 2014; Virnig et al., 2002, 2004; Virnig, Scholle, Chou, & Shih, 2007; Young et al., 2014). Three articles are reviews of the literature related to hospital readmissions (Calvillo-King et al., 2013; Damiani et al., 2015). One article provides both a descriptive analysis of secondary data and an analysis of key informant interviews with health plan representatives (Chou et al., 2007b).

The secondary data examined in these studies are of three types: those that make health-plan-level observations at the level of the contract between the MA plan sponsor and CMS, those that examine the experience of individual health plan participants and hospital patients, and those that look at the readmissions experience of hospitals participating in the traditional Medicare program. Three of the articles that look at health plan quality utilize plan-level data (Cahow et al., 2010; Couto et al., 2014; Young et al., 2014), twenty utilize individual-level data (Ayanian et al., 2013; Chou et al., 2007a, 2007b; Couto et al., 2014; Fremont et al., 2005; Harman et al., 2010; Holmes et al., 2013; Inovalon, 2015; Jung et al., 2016; Li, Cai, Glance, & Mukamel, 2007; Mahmoudi et al., 2016; Priest et al., 2012; Qato & Trivedi, 2013; Schmajuk et al., 2011; Schneider et al., 2002; Trivedi et al., 2005, 2006; Virnig et al., 2004; Virnig et al., 2002, 2007), and three use both plan- and member-level data (Inovalon, 2013, 2014b; *Report to Congress: Social Risk Factors and Performance Under Medicare's Value-Based Purchasing Program*, 2016). Among the articles examining hospital readmissions in the traditional Medicare program, twenty

two articles use individual patient data (Aranda et al., 2009; Arbaje et al., 2008a; Barnett et al., 2015; Bernheim, 2016; Blum et al., 2014; Eapen et al., 2015; Greysen et al., 2015; Gu et al., 2014; Hu et al., 2014b; Joynt & Jha, 2011; Krumholz et al., 1997, 2000; Lindenauer et al., 2013; McHugh et al., 2010; Nagasako et al., 2014; Rathore et al., 2003a, 2006; Rodriguez et al., 2011; Sheingold et al., 2016; Tsai et al., 2014), four examine performance at the hospital level (Carey, 2016; Joynt & Jha, 2013b; Kahn et al., 2015; Tsai et al., 2014), one uses both individual patient and hospital level data (*Report to Congress: Social Risk Factors and Performance Under Medicare's Value-Based Purchasing Programs*, 2016), two examine the effect of community level factors on readmission rates (Herrin et al., 2015; Kind et al., 2014) and three are reviews of the literature (Calvillo-King et al., 2013; Damiani et al., 2015; Fischer et al., 2014).

Section 5.4 Study Quality

All but four of the studies included clearly met the standards for credibility. They are each published in peer-reviewed journals or issued by government sources. The four self-published gray literature articles are open to debate regarding quality. The Cahow document was commissioned by the Association of Community Affiliated Plans, a trade association representing not-for-profit health plans (Cahow et al., 2010). The Inovalon documents are authored by an organization that consults with health plans (Inovalon, 2013, 2015, 2014b). The second and third of the Inovalon reports are sponsored by a group of health plans whose data are used as a part of those studies.

Section 5.5 Dependent Variables

The dependent variables differ by study (see Appendix D). The majority of the studies examining health plan performance study multiple measures of quality (Ayanian et al., 2014; Bird et al., 2007; Brennan & Shepard, 2010; Cahow et al., 2010; Chou et al., 2007a, 2007b ; Couto et al., 2014; Fremont et al., 2005a; Harman et al., 2010; Inovalon, 2014b; Jung et al., 2016; Mahmoudi et al., 2016; Priest et al., 2012; *Report to Congress: Social Risk Factors and Performance Under Medicare's Value-Based*

Purchasing Program, 2016; Schneider et al., 2002; Trivedi et al., 2005, 2006; Virnig et al., 2002, 2004, 2007; Young et al., 2014). However, a few look at a single measure only.

As discussed in the background section, the Medicare stars measure set changes annually. Because this study seeks to review the impact of the full effect of the Medicare stars program on health plan performance, and the post-ACA MA stars methodology went into full effect at the end of 2014, this literature review examines articles relative to the 2014 measure set.

Several of the articles examining the impact of SES characteristics on plan performance look at measures that had been removed from the measure set by 2014 (Bird et al., 2007; Brennan & Shepard, 2010; Cahow et al., 2010; Chou et al., 2007; Schneider et al., 2002; Trivedi et al., 2005; Virnig et al., 2002, 2007), but for which similar or successor measures were included in the 2014 measure set. For example, ten articles look at whether hemoglobin A1C (blood sugar) is checked for diabetics (a process measure). This measure was not included in the 2014 star measures set, but a related intermediate outcome measure, blood sugar controlled in members with diabetes, was included in the methodology. Similarly, two articles look at follow-up after treatment for mental illness (Virnig et al., 2004, 2007). This is no longer a star measure, but, in 2014, a measure was used that is derived from the Health Outcomes Survey entitled "improving or maintaining mental health," which is defined as the percentage of plan members whose mental health is the same or better than expected after two years. This measure is examined in one article (Harman et al., 2010). Appendix C details the measures included in each article and whether that measure or a related measure was included in the 2014 measure set.

Some of the 2014 Medicare stars measures are either not found in the literature or found infrequently. For example, only studies that include plan-level data (Cahow et al., 2010; Inovalon, 2013, 2014b; *Report to Congress: Social Risk Factors and Performance Under Medicare's Value-Based Purchasing Programs*, 2016) and the 2015 Inovalon study (Inovalon, 2015) include the measure "management of osteoporosis following fracture," and only two articles examine colorectal cancer screening (Cahow et al., 2010; *Report to Congress: Social Risk Factors and Performance Under Medicare's Value-Based Purchasing Programs*, 2016). Only the recent ASPE report examines functional

status (*Report to Congress: Social Risk Factors and Performance Under Medicare's Value-Based Purchasing Programs*, 2016). It is possible that the data lag between the addition of these measures to the methodology and the publication of the identified articles is responsible for their exclusion.

The dependent variable studied in the hospital readmission articles varies based on the readmission window examined and the condition studied. Eighteen articles look at readmissions within 30 days of discharge (Barnett et al., 2015; Bernheim, 2016; Blum et al., 2014; Carey, 2016; Eapen et al., 2015; Greysen et al., 2015; Gu et al., 2014; Herrin et al., 2015; Hu et al., 2014b; Joynt & Jha, 2011; Lindenauer et al., 2013; McHugh et al., 2010; Nagasako et al., 2014; Rodriguez et al., 2011; Sheingold et al., 2016; Singh et al., 2013; Tsai et al., 2014); four studies look at hospitals receiving penalties under the hospital readmission reduction program, which uses as its measure readmissions within 30 days of discharge for certain conditions (Carey, 2016; Figueroa et al., 2016; Joynt & Jha, 2013b; Kahn et al., 2015); one looks at both patient and hospital level data under the hospital readmissions reduction program (*Report to Congress: Social Risk Factors and Performance Under Medicare's Value-Based Purchasing Programs*, 2016), one looks at readmission within 60 days of discharge (Arbaje et al., 2008a); two look at readmission within one year of discharge (Rathore et al., 2003a, 2006); two look at readmission within six months of initial admission (Aranda et al., 2009; Krumholz et al., 2000); and two look at readmission within six months of discharge (Krumholz et al., 1997, 2000).

Four of the articles examine the characteristics of hospitals that received penalties under the Hospital Readmissions Reduction Program and Hospital Value-Based Purchasing Program (Carey, 2016; Figueroa et al., 2016; Joynt & Jha, 2013b; Kahn et al., 2015), one looks at both patient and hospital level data under the hospital readmissions reduction program (*Report to Congress: Social Risk Factors and Performance Under Medicare's Value-Based Purchasing Programs*, 2016). The remaining articles look at the impact of patient characteristics on hospital readmissions. Seven studies look at readmissions for heart failure (Aranda et al., 2009; Blum et al., 2014; Eapen et al., 2015; Krumholz et al., 1997, 2000; Rathore et al., 2003a, 2006). Eleven studies explore readmissions for heart failure, pneumonia, and acute myocardial infarction (Bernheim, 2016; Greysen et al., 2015; Gu et al., 2014; Herrin et al., 2015; Hu et al., 2014b;

Joynt& Jha, 2011; Lindenauer et al., 2013; McHugh et al., 2010; Nagasako et al., 2014; Sheingold et al., 2016). Two articles study readmission measures after heart failure and myocardial infarction (Damiani et al., 2015; Rodriguez et al., 2011). One article studies readmissions after coronary artery bypass grafting, pulmonary lobectomy, endovascular abdominal aortic aneurysm repair, colectomy, and hip replacement (Tsai et al., 2014). One article examines readmissions for heart failure, pneumonia, and acute myocardial infarction, chronic obstructive pulmonary disease, and total knee or hip arthroplasty as well as all cause readmission (*Report to Congress: Social Risk Factors and Performance Under Medicare's Value-Based Purchasing Programs,* 2016). Four studies examine only all-cause readmission (Arbaje et al., 2008a; Barnett et al., 2015; Fischer et al., 2014; Singh et al., 2013).

Section 5.6 Independent Variables and/or Covariates

Each article either examines the impact of a group of SES characteristics on quality performance or adjusts for those characteristics as covariates. Appendix E details those variables included in each study. Among the hospital readmission studies, 15 look at patient-level SES (Arbaje et al., 2008a; Barnett et al., 2015; Blum et al., 2014; Eapen et al., 2015; Greysen et al., 2015; Gu et al., 2014; Hu et al., 2014b; Joynt & Jha, 2011; Kind et al., 2014; Nagasako et al., 2014; *Report to Congress: Social Risk Factors and Performance Under Medicare's Value-Based Purchasing Programs,* 2016; Sheingold et al., 2016; Singh et al., 2013; Tsai et al., 2014), 20 account for patient race (Aranda et al., 2009; Arbaje et al., 2008b; Barnett & McWilliams, 2015; Eapen et al., 2015; Greysen, Auerbach, & Covinsky, 2015; Gu et al., 2014; Hu, Gonsahn, & Nerenz, 2014; Joynt, Orav, & Jha, 2011; Kind et al., 2014; Krumholz et al., 1997, 2000; McHugh et al., 2010; Nagasako, Waterman, & Dunagan, 2014; Rathore et al., 2003b, 2006; *Report to Congress: Social Risk Factors and Performance Under Medicare's Value-Based Purchasing Programs,* 2016; Rodriguez et al., 2011; Sheingold, 2016; Singh, Kuo, Nattinger, & Goodwin, 2013; Tsai et al., 2014), 9 account for the population served by the hospital either based on the proportion of patients eligible for Medicaid or Supplemental Security Income (Carey, 2016; Figueroa & Jha, 2016; Gu et al., 2014; Herrin et al., 2015; Joynt & Jha, 2013b; Kahn, Potetz, Walke, Hart Chambers, & Burch, 2015;

Report to Congress: Social Risk Factors and Performance Under Medicare's Value-Based Purchasing Programs, 2016; Rodriguez et al., 2011; Sheingold, 2016), and 4 account for hospital status as minority serving (Blum et al., 2014; Joynt & Jha, 2011; Rodriguez et al., 2011; Tsai et al., 2014). Two articles examine the impact of community factors (Herrin et al., 2015; Kind et al., 2014) on hospital readmissions. Each of the studies examining individual patient characteristics account for age and gender as either an independent or control variable either explicitly or through applying the risk standardized readmissions formula used by CMS for the Hospital Readmissions Reduction Program (Centers for Medicare and Medicaid Services, 2015c) which adjusts for age, gender and comorbidities.

The health plan studies, in contrast, examine a wide array of measures and SES characteristics. Twenty-one articles include an array of independent and control variables related to SES, including personal income, neighborhood income and/or poverty, Medicaid eligibility, eligibility for a low-income subsidy, and neighborhood educational attainment (Bird et al., 2007; Brennan & Shepard, 2010; Cahow et al., 2010; Chou et al., 2007a, 2007b; Couto et al., 2014; Fremont et al., 2005a; Harman et al., 2010; Holmes et al., 2013; Inovalon, 2015, 2014b; Jung et al., 2016; Mahmoudi et al., 2016; McBean et al., 2003; Priest et al., 2012; Qato & Trivedi, 2013; *Report to Congress: Social Risk Factors and Performance Under Medicare's Value-Based Purchasing Programs*, 2016; Schmajuk et al., 2011; Schneider et al., 2002; Trivedi et al., 2005, 2006; Virnig et al., 2002, 2004 , 2007; G. J. Young et al., 2014). Appendix F provides definitions of SES by study. While 9 of the health plan studies looked at educational attainment. (Bird et al., 2007; Cahow et al., 2010; Inovalon, 2015; Jung et al., 2016; Mahmoudi et al., 2016; Priest et al., 2012; Schmajuk et al., 2011; Schneider et al., 2002; Young et al., 2014), the specific definition of educational attainment also varied by study. Again, Appendix F provides definitions by study. Race/ethnicity is used as a variable in twenty-two of the health plan studies (Ayanian et al., 2013, 2014; Bird et al., 2007; Cahow et al., 2010; Chou et al., 2007a; Harman et al., 2010; Holmes et al., 2013; Inovalon, 2013, 2014a, 2015; Jung et al., 2016; Mahmoudi et al., 2016; McBean et al., 2003; Qato & Trivedi, 2013; *Report to Congress: Social Risk Factors and Performance Under Medicare's Value-Based Purchasing Programs*, 2016; Schmajuk et al., 2011; Schneider et al., 2002; Trivedi et al.,

2005, 2006; Virnig et al., 2002, 2004, 2007). The races/ethnicities examined vary by article and also can be found in Appendix F.

Gender is used as an independent or control variable in each health plan study, except for Cahow and Young (Cahow et al., 2010; Young et al., 2014). Comorbidities were inconsistently included as independent or control variables making analysis of their impact across measures of quality impossible. Each of the hospital readmission studies include some measure of comorbidities as a control variable, while only eight of the health plan articles also do so (Harman et al., 2010; Holmes et al., 2013; Inovalon, 2013, 2014a, 2015; Jung et al., 2016; Mahmoudi et al., 2016; Priest et al., 2012).

Section 5.7 Themes

Several themes are identified in the body of literature. First, the association between SES and quality performance differs by measure. Second, that race, gender, and age are associated with differences in performance on both process and outcome measures. Third, educational attainment is associated with positive quality performance. Finally, lower-SES is associated with poorer performance on the studied measures of quality but the SES-related attributes that underlie that differential in performance as well as the extent performance differential varies significantly by study. These themes will be further discussed here.

Section 5.7.1 The Measure Matters

The impact of SES characteristics on quality measure performance varies by measure and by study design, making synthesis of the studies and conclusions regarding the impact of any given characteristic across all measures nearly impossible. As described in Appendix C, the included studies examine the impact of SES characteristics on a combined 203 individual quality measures. One hundred and three of those measures were process measures, such as breast and colorectal cancer screening; 60 were intermediate outcome measures, such as medication adherence and blood pressure control; and 39 were outcome measures, such as hospital readmissions and improving and maintaining physical and

mental health. While virtually all of the health-plan-related studies found an impact of the studied SES-related variables on quality performance, the articles examining hospital readmissions were more mixed.

As Appendix C indicates the vast majority of the studied outcome measures are readmissions. The most frequently studied intermediate outcome measures are control of blood pressure and cholesterol in patients with cardiac diagnoses; diabetes care measures, including cholesterol or glycemic control in patients with diabetes; high-risk medication prescribing; and measures of medication adherence.

Among articles examining the impact of gender, race, and SES on intermediate outcome measures of glycemic, blood pressure, and cholesterol control, the articles indicate persistent but in some cases declining disparities. For example, Fremont and colleagues examine racial disparities on four measures of diabetes care, controlling for age, gender, and SES. They concluded that, after adjustment, significant racial disparities persist for 3 of the 4 measures and that SES disparities persist for all four measures (Fremont et al., 2005b). While Ayanian and colleagues look at performance on three similar measures and find that while the magnitude of the disparity varied by geography and by the years studied, black and Hispanic MA enrollees in both 2006 and 2011 were substantially less likely than white enrollees to have adequate control of blood pressure, blood sugar, and cholesterol, while Asian and Pacific Islanders were more likely than whites to have adequate control of blood pressure and cholesterol and were equally likely to have adequate control of blood sugar (Ayanian et al., 2014). However, the authors point out that substantial reductions in disparities in one specific region could be attributable not to the plan or region but to beneficiary characteristics not accounted for in the study design (Ayanian et al., 2014).

When examining racial disparities among MA participants with diabetes, Mahmoudi and colleagues find that between 2006 and 2011, after adjusting for an array of health, geographic, and SES factors, MA had a positive impact on health disparities between white and Hispanic Medicare beneficiaries on all four studied measures of quality and had a small but mixed effect on disparities between black and white beneficiaries (Mahmoudi et al., 2016). ASPE found that Black and Hispanic beneficiaries have higher than average odds of receiving a diabetic eye exam or to receive monitoring for

kidney disease but had 17% lower than average odds of having blood sugar controlled (*Report to Congress: Social Risk Factors and Performance Under Medicare's Value-Based Purchasing Programs*, 2016).

With respect to measures related to pharmaceutical prescribing and adherence, disparities are visible both among outcome and process measures. The articles that examine measures of medication adherence (which are intermediate outcome measures) consistently find a negative association between SES and medication adherence (Cahow et al., 2010; Couto et al., 2014; Inovalon, 2013, 2015, 2014b; *Report to Congress: Social Risk Factors and Performance Under Medicare's Value-Based Purchasing Programs*, 2016; Young et al., 2014). Similarly, two of the three studies examining higher rates of prescribing high-risk medications find an association between low-SES and increased prescribing (which is an intermediate outcome measure) (Inovalon, 2015; Schmajuk et al., 2011). One finds higher rates of prescribing potentially inappropriate medications (which is a process measure (Holmes et al., 2013)) among lower SES beneficiaries. One article finds an association between low-SES and higher rates of inappropriate prescribing of pharmaceuticals used to treat rheumatoid arthritis (a process measure) (Qato & Trivedi, 2013). Finally, one article contains mixed findings identifying an association between a higher odds of high-risk medication prescribing and residence in a low-income area but lower odds of high risk medication prescribing among beneficiaries who are dually eligible for Medicare and Medicaid or eligible for a low income subsidy under Medicare (*Report to Congress: Social Risk Factors and Performance Under Medicare's Value-Based Purchasing Programs*, 2016).

The articles examining the impact of individual beneficiary characteristics on health plan quality measures generally find an impact of race, education, SES, and gender on measure performance. The magnitude of this impact varies by study. Additionally, while adjusting for differential SES composition of plan enrollees consistently reduces differences in performance outcomes across plans, it does not completely eliminate them. The studies that look at the impact of these characteristics on overall health plan performance under the MA stars methodology consistently find an impact of plan member SES characteristics on plan-level performance on Medicare stars measures.

Among the hospital readmission studies, the independent variables examined vary significantly. However, where studied, they consistently find nonwhite race (Aranda et al., 2009; Damiani et al., 2015; Greysen et al., 2015; Hu et al., 2014b; Joynt & Jha, A. K., 2011; Krumholz et al., 1997; McHugh et al., 2010; Rathore et al., 2003a; Rodriguez et al., 2011; Tsai et al., 2014), nonmarried status/living alone (Arbaje et al., 2008a; Barnett et al., 2015; Damiani et al., 2015; Herrin et al., 2015; Hu et al., 2014b), and functional impairments in ADLs or IADLs (Arbaje et al., 2008a; Barnett et al., 2015; Greysen et al., 2015) to be associated with higher rates of readmission. One study, however, finds that while black and Hispanic beneficiaries were more likely to be readmitted, the effect of race was largely mediated when controlling for beneficiary status as dually eligible for Medicare and Medicaid (*Report to Congress: Social Risk Factors and Performance Under Medicare's Value-Based Purchasing Programs,* 2016). However, the effect of common SES-related variables, including income (no (Arbaje et al., 2008a), yes (Barnett et al., 2015; Fischer et al., 2014; Greysen et al., 2015; Hu et al., 2014b), inconclusive (Calvillo-King et al., 2013; Damiani et al., 2015)), wealth (yes (Greysen et al., 2015)), education (yes (Arbaje et al., 2008a; Greysen et al., 2015; Hu et al., 2014b), inconclusive (Calvillo-King et al., 2013)), residence in a high poverty neighborhood (yes (Hu et al., 2014b)), and a composite measure of neighborhood SES (yes (Blum et al., 2014; Eapen et al., 2015; Kind et al., 2014; Lindenauer et al., 2013), inconclusive (Damiani et al., 2015; Rathore et al., 2006), no (Herrin et al., 2015)), is less consistent.

In sum, both sets of studies suggest that certain SES characteristics measured at the patient, plan, hospital and community level and using census data as a proxy for individual patient attributes reveals an association between patient/beneficiary attributes and lower performance on the studied measures of quality. The magnitude of that association, the impact of individual factors, and whether the relationship is causal cannot be concluded from the literature currently available.

Section 5.7.2 Effect of Race, Gender, and Age on Both Process and Outcome Measures

In the health plan studies, while most of the performance differences correlated with gender favor men, a few, like within-race cholesterol control for diabetics (Chou et al., 2007a), do not. Three studies find persistent gender disparities on an array of measures (Bird et al., 2007; Chou et al., 2007a, 2007b).

Three studies find that controlling for gender modifies, but does not eliminate, disparities based on other factors (Trivedi et al., 2005, 2006; Virnig et al., 2002). Similarly, two addition studies find that controlling for gender, in addition to other demographic and SES characteristics, fails to eliminate disparities based on geographic location (Virnig et al., 2007; Couto et al., 2014).

Adjusting for the other SES characteristics, such as household and neighborhood income, educational attainment, and eligibility for Medicaid, moderated, but did not ameliorate, most of the disparities in race and gender (Ayanian et al., 2013; Bird et al., 2007; Chou et al., 2007a, 2007b; Fremont et al., 2005a; Qato & Trivedi, 2013; Schmajuk et al., 2011; Schneider et al., 2002; Trivedi et al., 2005; Virnig et al., 2002, 2007). However, as stated, 1 study finds that while black and Hispanic beneficiaries were more likely to be readmitted, the effect of race was largely mediated when controlling for dual eligibility (*Report to Congress: Social Risk Factors and Performance Under Medicare's Value-Based Purchasing Programs*, 2016).

With respect to the articles related to readmissions, each of the studies adjusts for age and gender. Twenty-four of the 29 readmission studies adjust for race, but the races included and the how they are defined substantially differ by study. Nonwhite race (other than Asian) was consistently associated with higher rates of readmission (Aranda et al., 2009; Damiani et al., 2015; Greysen et al., 2015; Hu et al., 2014b; Joynt & Jha, 2011; Krumholz et al., 1997; McHugh et al., 2010; Rathore et al., 2003a; Rodriguez et al., 2011; Tsai et al., 2014). Age is also consistently positively associated with readmissions. Results with respect to gender are mixed.

Section 5.7.3 Educational Attainment Appears Associated with Positive Outcomes

Among the health plan articles, Young finds that the percentage of individuals in a health plans' service area who do not have a high school diploma is significantly negatively associated with plan performance along three medication adherence scores (Young et al., 2014). Among the readmission articles, several articles identify higher educational attainment as being associated with a lower risk of readmission (Arbaje et al., 2008a; Blum et al., 2014; Eapen et al., 2015; Herrin et al., 2015).

Section 5.7.4 Lower Socioeconomic Status and Quality Performance

Each of the health-plan-level studies identify the presence of low-income and/or low SES beneficiaries as associated with lower performance for the health plan quality measures (Cahow et al., 2010; Inovalon, 2013, 2014a; *Report to Congress: Social Risk Factors and Performance Under Medicare's Value-Based Purchasing Programs*, 2016; Young et al., 2014). Among the articles related to the impact of beneficiary characteristics on health plan quality achievement, beneficiary SES is significantly associated with lower performance on anywhere from 1 to 17 measures of quality (Fremont et al., 2005b; Priest et al., 2012; Qato & Trivedi, 2013; *Report to Congress: Social Risk Factors and Performance Under Medicare's Value-Based Purchasing Programs,* 2016; Schmajuk et al., 2011), However, the extent of the impact varies by the dependent and independent variables included in the study. As a result, while an association between low-SES beneficiaries and lower quality performance appears to exist, the extent of that association and whether it is causal cannot be concluded.

The hospital readmission studies produce similar results. The hospital-level studies (Figueroa et al., 2016; Joynt & Jha, 2013b; Kahn et al., 2015; *Report to Congress: Social Risk Factors and Performance Under Medicare's Value-Based Purchasing Programs,* 2016) consistently find that hospitals serving a higher proportion of DSH-eligible patients receive higher readmission penalties, although one study finds that the most penalized hospitals are not those with the highest proportion of DSH-eligible patients (Kahn et al., 2015) and three find that adjustment of those results for SES has very little impact on hospital performance (Bernheim, 2016; Blum et al., 2014; Sheingold, 2016). However, several articles find at least a modest association between specific SES factors and the risk of readmission, including dual eligible status and hospital dual eligible share (Gu et al., 2014; *Report to Congress: Social Risk Factors and Performance Under Medicare's Value-Based Purchasing Programs*, 2016); patients residing in neighborhoods with high poverty, low income, and low educational levels (Hu et al., 2014b); income inequality (Lindenauer et al., 2013); Medicaid eligibility (*Report to Congress: Social Risk Factors and Performance Under Medicare's Value-Based Purchasing Programs,* 2016; Sheingold et al., 2016; Singh et al., 2013); limited education (Arbaje et al., 2008a); lower quartiles of income (Lindenauer et al., 2013);

and neighborhood-level SES drawn from census data tied to ZIP codes (Barnett et al., 2015; Bernheim, 2016; Blum et al., 2014; McDowell, 2009; Nagasako et al., 2014; Rathore et al., 2006).

The size of the impact of SES on the identified disparities in hospital readmissions and whether that disparity is meaningful from a policy perspective is a topic of some debate. Five of the readmissions studies model the effect of risk adjusting the measure of readmissions for SES. Three of those studies find that applying an SES adjustment does not improve the measurement methodology (Bernheim, 2014; Fischer et al., 2014; Sheingold, 2016), one supports the application of risk adjustment (Nagasako et al., 2014); one finds that while applying risk adjustment to a community of hospitals did not have any impact on the performance of nearly all of the hospitals, for those few hospitals it did impact, the impact was not insignificant (Bernheim, 2016; Blum et al., 2014) and one finds that after adjusting for dual eligibility, risk adjustment would reduce the differential percentage of safety net and non-safety-net hospitals by 4% (*Report to Congress: Social Risk Factors and Performance Under Medicare's Value-Based Purchasing Programs*, 2016) .

Section 5.8 Study Quality

While peer-reviewed literature, government studies and studies funded by health plans are included in this review of the literature, the findings that some SES factors impact plan and hospital performance on some measures of quality are consistent.

Section 5.9 Issue Significance

This literature review focuses on the issue of relevance for the Medicare program and its millions of beneficiaries. The articles identified for this literature review reflect the experience of millions of Medicare beneficiaries participating in hundreds of health plans and receiving treatment in nearly all of the nation’s hospitals. Medicare increasingly relies on quality-based or value-based payments, and the literature suggests that hospital and plan performance on the measures of quality can be affected by individual and community socioeconomic status.

Section 5.10 Gaps in the Current Literature

Each of the included studies examines the correlation between a certain SES factor or factors and performance on measures included or closely related to those included in the Medicare stars measure set. These articles, as a body, appear to indicate that SES characteristics are associated with differences in quality measure performance but whether the association is causal remains unclear.

This literature review raises several important questions which are, as yet, unanswered in the literature. Those questions include whether the association between SES and quality performance is causal, which specific SES characteristics impact health plan and hospital quality performance and whether that impact positive or negative. Possibilities include social risk factors examined in the literature (e.g., income, gender, race, and educational attainment), as well as other unexamined factors, such as health system bias, health literacy, or the availability of community resources and social supports not examined in these studies. The studies examining the impact of SES and other demographic factors on health plan performance do not consistently include health status or comorbidities as an independent or control variable. These same studies with respect to both health plan quality performance and hospital readmissions do not frequently or consistently include functional status as an independent or control variable. Studies bringing together SES data, functional status data and comorbidity data are needed to determine whether observed disparities are offset when controlling for relative disease and disability burden.

As a result of limitations in the available data, virtually all of the articles use census data as a proxy measure of individual patient/beneficiary attributes other than race and gender, including SES, income, and educational attainment. While census data is widely and easily available, it does not reflect the specific attributes of the individual hospital patients and plan beneficiaries. In addition, because census areas at even the most granular level (called ZIP code tabulation areas) include thousands of people, they may offer an inaccurate picture of a given area due to wide disparities of wealth in that area (*Report to Congress: Social Risk Factors and Performance Under Medicare's Value-Based Purchasing Programs,* 2016). In addition, several studies speak to the limitations on available race data. As a result, a

gap exists in the literature between population-level attributes (i.e., ZIP-code-level average income) and individual-level attributes (i.e., individual income) and the impact of these attributes on quality measure performance. This gap is likely to be filled by the work currently under way at ASPE under the requirements of the IMPACT Act (Improving Medicare Post-Acute Care Transformation Act of 2014, 2014).

Section 5.11 Implications for Future Research

To address the gaps outlined above, access to data at the individual level, which includes information regarding the subject's demographic and underlying health status, is needed. As a result of the requirements imposed under the ACA, a great deal of additional data regarding the SES characteristics of health plan participants is now being collected (PPACA, 2010). Further studies should leverage these data elements as well as the data identified by the NAM (National Academies of Sciences, Engineering, and Medicine 2016b) to establish what, if any, causal link exists between SES characteristics and performance on quality measures. It should also leverage the recent findings of the NAM and ASPE under the requirements of the IMPACT Act (Improving Medicare Post-Acute Care Transformation Act of 2014, 2014) regarding the impact of social risk factors on plan performance under the MA stars methodology (National Academies of Sciences, 2017; *Report to Congress: Social Risk Factors and Performance Under Medicare's Value-Based Purchasing Programs*, 2016).

None of the studies included in this review of the literature provide a qualitative analysis of the impact of SES characteristics on quality measure performance, what can be done to off-set the impact, and what, if any, changes to the measure set and/or methodology are needed to effectively address the methodological impact of these SES differences on quality measure performance. This research is intended to fill this gap, by conducting key informant interviews of leaders in the health care quality measurement field, the regulatory community, the patient advocacy community, MA plans, and Medicare-participating providers regarding their opinion of whether SES characteristics and plan and provider quality performance are associated. And, if so, to gain their perspective on the individual SES

characteristics that pose the greatest barriers to achieving high-quality scores. This research can provide important insights into the potential need for changes to the measurement system. It also can assist measure stewards and policy makers in effectively addressing the impact, if any, of beneficiary SES characteristics on quality measure performance, while continuing to provide appropriate incentives to health plans and providers so as to achieve higher quality care for all MA beneficiaries.

The literature included in this review shows differential performance on some quality measures associated with some SES characteristics. However, the literature does not, to date, fully address either causality or possible confounders. The NQF trial period offers an opportunity to pursue further quantitative research to assist in establishing a causal link between these factors and quality measure performance (National Quality, 2014a).

Section 5.12 Limitations of the Review Process

The searches used in this literature review were limited to PubMed and Google Scholar. Additional articles might have been identified through other databases, or more robust engagement of professional contacts to identify both peer reviewed and high-quality non-peer-reviewed articles. This review intentionally limited gray literature to the four documents that were included. A substantial number of other non-peer-reviewed research on this issue likely exists. In addition, this literature review was limited to studies of health plan performance on quality measures included in the MA stars methodology and hospital performance on readmissions. A substantial body of literature considers the impact of SES characteristics on the performance of physician groups, nursing facilities, dialysis facilities and home health agencies, and other provider types, both within and outside of Medicare, as well as a large body of international literature on the impact of SES on quality performance both were outside the scope of this review.

Section 5.13 Conclusion

Quality measurement offers health care purchasers and consumers the potential opportunity to select health plans and providers that deliver high-quality care. The literature included in this review indicates that some of the performance differences between health plans and hospitals on quality measures included in the Medicare stars and Hospital Readmissions Reduction Programs may be associated with the SES characteristics of health plan beneficiaries and hospital patients. However, the literature does not, to date, fully address either causality or possible confounders. Further research is needed to understand whether a causal link can be identified between SES factors and quality measure performance and what, if anything, can and should be done to address the impact of those factors.

CHAPTER 6: RESEARCH DESIGN AND METHODOLOGY

Section 6.1 Conceptual Model

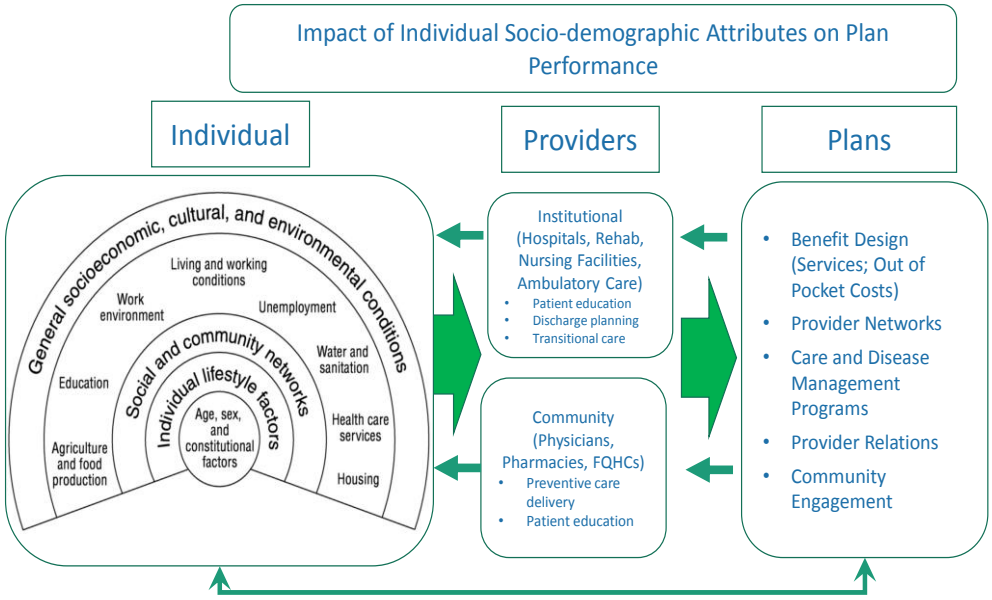
The NQF's technical report on sociodemographic factors and quality measurement states: "There is a large body of evidence that various sociodemographic factors influence outcomes and thus influence results on outcome performance measures" (National Quality Forum, 2014b) However, as discussed above, the existing literature appears to indicate an association between certain SES characteristics and quality performance on a wide array of quality measures but has not determined that there is a causal relationship between the two. While causality may take decades to prove, the strength and consistency of the association has been sufficiently significant to lead NQF and CMS to act on this issue (*Announcement of Calendar Year (CY) 2017 Medicare Advantage Capitation Rates and Medicare Advantage and Part D Payment Policies and Final Call Letter*, 2016; National Quality, 2014a). This study similarly assumes that the strength of this association is sufficient to merit more sensitive use of SES and other deprivation factors for incentive based payment.

Dahlgren and Whitehead (Dahlgren & Whitehead, 2007) developed one of several widely used conceptual models which describe the impact of demographic, lifestyle, social and environmental factors on the health of a given individual. This study uses a conceptual model based on the Dahlgren and Whitehead (Dahlgren & Whitehead, 2007) model which hypothesizes that the factors which impact the health of individual patients also impact how they engage with the health care system (defined as providers and plans). That, in turn, impacts the health care experience for those persons and the ability of the providers and plans that serve them to achieve the goals defined in the measures of quality included in the MA stars methodology.

The conceptual model used in the study (laid out below) describes the interaction of individual patients/beneficiaries with their environment and the relationship of the patient/beneficiary SES context

on their interaction with the health care providers and health plans that serve them (Figure 3). This model posits that people with lower SES (e.g., those who have lower income, less education, lower health literacy, and language barriers), those who lack social and community networks (e.g., people who are homeless, isolated, or without caregiver support), and those who live in unsafe housing or communities, will have more difficulty interacting with the health care system and managing their health problem or problems. These factors may, in turn, impact plans' and providers' ability to deliver services and achieve the outcomes included as measures of plan performance under the stars methodology. In response, MA plans may make changes to their service areas, products, or service delivery models for the purpose of improving their stars scores. Such service changes may include providing supplemental benefits focused on gaps in the social safety net, such as enhanced transportation and nutrition benefits, or by modifying their model of care to improve or add care and disease management programs, or providing supplemental language services. Changes to product designs that could make the product less attractive to a population of individuals with low SES status could include requiring increased cost sharing of beneficiaries, adding or suspending zero or low cost-share plans, and offering networks that exclude providers who traditionally serve underserved communities. In this study, I use the conceptual model presented in Figure 3 to evaluate the impact of SES characteristics on health plan quality performance under the MA stars methodology. Specifically, by utilizing an explanatory, mixed methods approach, I use this conceptual model to investigate whether patient/beneficiary SES factors impact plan performance under the stars methodology; determine whether plan supplemental and enhanced benefits and product designs associated with SES barriers to quality care changed at the same time as the full force of the post-ACA stars methodology was implemented and, if they did, to understand whether the identified changes in benefit packages and product designs differed based on the SES characteristics of plan membership; and finally, to develop a package of proposed changes to the MA program to address any identified effects of SES-related factors on plan performance under the MA stars program.

Figure 3. Conceptual model



CHAPTER 7: THE RESEARCHER'S ROLE

The researcher's personal values and biases must be identified prior to undertaking any study. When this study commenced, I was an employee of an MA plan sponsor. Today, I am employed by a state Medicaid agency with oversight over the state's DSNP contracts. As a result, the equity of the MA stars methodology is of significant importance to both my current and former employers and my perceptions of the equity of the MA stars methodology have been formed in the context of those positions. To address the biases formed by my experiences, the phase one design included a series of oversight and validation processes. A second coder was engaged to independently code each of the phase one transcripts. The second coder possesses a Master of Public Health and substantial experience in qualitative coding in public health research. She had no prior experience in the fields of health insurance, Medicare Advantage or health care quality measurement, and, consequently, she was able to code without issue-related bias. Phase one coding results were reviewed individually by code to ensure inter-rater reliability.

The questionnaire used in the phase one key informant interviews was reviewed and approved by the dissertation chair prior to use. The draft and final codebooks were developed collaboratively with the second coder and were presented for the review and approval of the dissertation chair prior to use. To ensure a diversity of perspectives, key informants were selected by organizational affiliation based input received from the dissertation committee.

Phase 2 sought to provide a quantitative analysis of health plan filings in order to determine whether the end of the quality bonus demonstration program has resulted the addition or deletion of benefits and product designs associated with quality performance and positive or negative risk selection as identified in the literature and via the key informant interviews conducted in phase 1. This phase sought to examine whether those changes differed based on each plan's proportion of low-income

membership and the demographic attributes of the counties in the plan's service delivery area. Because I am not a statistician, an independent research team was engaged. The analysis was conducted using publicly available plan benefit package and membership data available on the CMS Web site which I provided to the research team. We collaboratively developed the statistical model. Once defined, the model was submitted to and approved by the dissertation chair and the quantitative methodologist who served on the dissertation committee. The statistical analysis was conducted utilizing SAS (v.9.4) (Cary, NC). The results were analyzed by both the independent research team and myself and conclusions were collectively agreed on.

Phase 3 participants were selected from each of the key informant types included in phase 1 to ensure diverse perspectives. Phase 3 participants were selected based on the extent of their knowledge about the details of the stars methodology that they displayed in the phase 1 interviews as well as their availability. The questionnaire used for the phase three interviews was presented for the review and approval of the committee. The phase 3 survey was administered online using Survey Monkey. I conducted each of the follow up interviews solely to review and validate the online survey results.

Table 3. Research aims, methods, and data sources

Research aim	Methods	Data sources
To conduct key informant interviews to provide a qualitative analysis of the impact of SES characteristics on quality measure performance, what can be done to off-set the impact, and what, if any, changes to the measure set and/or methodology are needed to effectively address the methodological impact of these SES differences on quality measure performance;	Semistructured key informant interviews	Thirty key informants representing five different stakeholder types
To conduct a statistical analysis of plan benefit packages to examine the difference, if any, in benefit design among plans with varying proportions of low-income subsidy eligible members and members residing in more deprived service areas.	Multivariate analysis of plan benefit package filings for 2014 and 2015 examining the presence or absence of certain benefits and design features for which there are literature and key informant opinions indicating that the provision of that the benefit or design feature may improve some measure of quality included in the stars measure set.	Publicly available Medicare data files
To carry out a policy analysis of strategies to enhance any positive consequences and ameliorate any negative consequences of beneficiary SES factors on performance under the MA Stars program identified in aims 1 and 2	Semistructured key informant Interviews	Five follow-up key informants, one from each of the five stakeholder types
To develop a plan for change to improve MA quality and access based on data gathered in aims 1-3, if any	Leverage the Kotter model for managing change and the agenda building, and evidence-based strategy for policy development to develop a plan for change focused on implementing the findings of phases 1-3	Data gathered in phases 1-3

CHAPTER 8: KEY INFORMANT INTERVIEWS IN PHASE ONE

Section 8.1 Methods

In phase 1 of the study, 30 key informant interviews were conducted. With the guidance of the dissertation committee, a list of key informants was developed with the goal of interviewing 19 respondents representing academics and consultants active in the area of Medicare and MA ("Thought leaders"), regulators, policy makers, and quality officials ("Regulators"), providers ("Provider representatives"), health plans ("Plan representatives"), and consumers ("Consumer representatives"). To offset concerns regarding sufficient participation because, at the time of the interviews I was employed by an MA plan sponsor, 61 potential key informants were identified and contacted. Each potential key informant who agreed to participate was included. This process resulted in an increased sample size of 30. One of the 30 interviews included 2 representatives from the same organization. Because they concurred on each answer, their results are reported as a single key informant.

Thought leaders included academics whose research appears in the literature review, policy analysts published in the areas of Medicare or MA quality measurement and consultants with significant experience assisting and evaluating MA plans. Regulators included staff from the state and federal government agencies with oversight and advisory roles with the Medicare and Medicaid programs including dual special needs plans and staff from organizations which promulgate and endorse quality measures used in the stars measure set. Key informants representing providers included staff both from trade associations representing providers and individual provider organizations. Plan representatives similarly included staff from trade associations representing health plans and leadership from individual plans. Consumer representatives included individuals from organizations representing all Medicare consumers, all health plan consumers and health care consumers with specific health needs. After review

by the Institutional Review Board of the University of North Carolina at Chapel Hill, the study was found to be exempt.

Study participants were approached via U.S. Mail and email. Each initial outreach was followed with follow-up via email and a telephone call. Participants were identified utilizing literature in the field, membership or affiliation with an identified entity, and professional affiliation. A copy of the letter of solicitation is included in Appendix K. I interviewed each willing key informant. Informed consent was obtained verbally. Each of the key informants was interviewed using a uniform interview guide. Interviews took between thirty minutes and one hour to complete. Interviews were conducted between December 1, 2015 and March 31, 2016. A copy of the key informant interview guide including the consent request is included in Appendix A. Each interview was audiorecorded. Twenty-nine interviews were conducted via phone and one was conducted in person. A list of participants by stakeholder type is included in Table 4.

Table 4. Stakeholder types and potential sources of key informants

Stakeholder type	Proposed number of interviews	No. of interviews conducted
Consumers	3	4
Regulators/Policy makers/ Measurement officials (Regulators)	5	9
Academics/Thought leaders (Thought leaders)	3	7
Providers	3	4
Plans	5	6

Three interviews were recorded using a Sony ICD-PX333 digital recorder and 27 were recorded using the TapeACall smartphone app. Each was transcribed using a professional transcription service (2 using Professional Transcriber Inc., 28 using the Rev application for iPhone).

Each interview began with the key informant describing their professional role and their role, if any, in quality measurement and improvement. Each key informant was asked a series of twelve questions, several with subparts. Key informants were asked a series of questions regarding the general use of quality measurement in Medicare Advantage, the benefits and burdens of the current stars

methodology, the impact of SES characteristics on plan and provider performance on quality measures and how, if at all, the stars methodology might be improved to address any barriers they identified.

Initially, the research methodology included three supplemental questions to be asked only of individuals with significant experience in plan and provider practices defined as Regulators and Plan and Provider representatives. These questions related to whether health plan tactics and strategies have changed in light of changes to the MA stars program and, if so, how. Specifically, key informants were asked to identify methods, if any, plans are using to tailor their practices to the needs of low SES beneficiaries. After the first 4 interviews, it became clear that the type of key informant did not necessarily determine whether or not they had information of this sort. As a result, beginning with interview 5, each key informant was offered the opportunity to answer the supplemental questions. In all, six key informants (four Thought leaders and two Consumer representatives) did not answer those three supplemental questions.

Section 8.2 Data Analysis Process

Each transcript was given an identity code. I reviewed each transcript for accuracy and stored each of them in a locked Google drive folder. A second coder was engaged to mitigate any potential for bias on my part. The transcripts were imported into Atlas.ti for analysis. Utilizing the first several interview transcripts, the second coder and I collaboratively developed a coding dictionary and the codes input into Atlas.ti. Emergent codes were added to the coding dictionary as they were identified. The second coder and I each individually coded all 30 transcripts. Once complete, a code co-occurrence comparison was done to ensure interrater reliability. The second coder and I collaboratively reviewed the co-occurrence table and identified each code on which we lacked agreement (21 of 76 codes). For each of those codes, a report was generated listing each quote assigned that code by either me or the second coder. Those reports were exported to Google docs and collaboratively, each quote was reviewed by both second coder and I until concurrence was achieved for each code.

Section 8.3 Results

Section 8.3.1 Overview

Each interview began with a series of general questions regarding key informants' views on the use of quality measurement in Medicare Advantage, the feasibility of achieving equivalent quality care in all SES strata and their opinion regarding the current Medicare Advantage stars quality measurement program. Next, key informants were asked specific questions regarding SES factors, if any, that they believe form barriers to quality care for low SES populations, the impact of the MA stars program on care quality for low SES beneficiaries, and efforts plans, providers, and CMS can take to offset SES factors that form barriers to achievement on measures of quality. They were then asked for their opinion regarding the appropriateness of accounting for SES factors in quality measurement separately from accounting for underlying health status. In addition, they were asked for recommendations, if any, for improving the MA program and, specifically, the stars methodology, in order to improve the quality of care for low SES beneficiaries. Finally, they were asked whether plans should tailor their practices to meet the needs of low SES beneficiaries, whether they are doing so today and, if so, best practices the respondent had identified in delivering high-quality care to low SES beneficiaries.

Section 8.3.2 Use of Quality Measurement in Medicare

Nearly all of the key informants expressed support for quality measurement in MA. Across key informant types, common reasons given for supporting the use of quality measurement in MA include creating an incentive for improvement, improving the quality of care, increasing transparency and accountability in health plan performance, informing consumer choice, assuring that the Medicare program is purchasing services based on value rather than volume, and improving the patient/beneficiary experience of care. The most commonly cited reasons were: creating an incentive for improvement and improving quality of care, were widely supported by most key informant types. Regulators were more likely to support quality measurement for accountability purposes, whereas other types of key informants were more likely to identify transparency as a reason to support quality measurement in MA.

Section 8.3.3 Is Equivalent Care Possible?

The majority of key informants said that in light of known health, economic, educational and environmental disparities, a health plan or provider cannot ensure equivalent care quality. However, several respondents made a distinction between equivalence in care delivery and equivalence in outcomes, expressing the belief that equivalence in outcomes could not be achieved, but equivalence in care delivery could. Among the key informants who said that equivalence could be achieved, each noted the greater level of effort that would be required to achieve it. For example, a Regulator said,

> I would say yes, but you have to work at it. For example, certain providers, as a health plan, if you know you're going to have a mix of certain populations, then you need to have providers and other staff that are able to handle those populations, which is kind of like why you have the special needs plans. …. You need specialized tactics in a way to deal with these populations. Yes, I think it can be done but it is a very intensive process.

None of the Provider representatives and only one of the Plan representatives thought that equivalence could be ensured.

Section 8.3.4 SES Factors that Form Barriers to Plan and Provider Performance on Quality Measures

Key informants were asked whether they believed that patient SES characteristics impact plan and provider performance on quality measures and, if so, whether there were specific SES factors that have more or less impact. Twenty-nine of the 30 key informants answered this question. Among those who responded, most believed that SES factors do impact plan and provider performance on quality measures. Several respondents said that the impact of SES factors plan and provider performance varied by quality measure. Only one person said that SES characteristics did not impact plan or provider performance on quality measures. Most of the key informants in each key informant category identified income, poverty, or wealth as impacting plan performance on quality measures. In addition, many of the Plan and Provider representatives and Regulators identified transportation as a barrier to performance on quality measures. Some key informants also identified beneficiaries' educational attainment, health literacy, housing status (or homelessness), lack of social supports, and food access (nutritional status) as barriers that adversely impacted quality performance. A few respondents also replied that a person's

location (rural areas, poor or unsafe neighborhoods) and access to providers and pharmacies formed barriers to quality care.

Key informants also identified an array of non-SES barriers that they characterize as associated with SES. The most commonly mentioned of these barriers were community norms and ethnic/cultural norms. Community/peer group norms including peer group risk behaviors were identified by Regulators and Plan representatives. For example, a Regulator described the influence of peer behaviors on smoking as follows:

> I think your peer group has a lot of impact on the behavior that you describe or you employ for yourself. For example, if there's a maybe a neighborhood where a peer group a lot of smoking is happening then smoking may not seem to be as big as a deal for you as an individual your doctor may say hey you need to quit smoking but if everyone on your street does it, it's not going to seem maybe as bad. So, I think that does have some impact.

Several of the key informants, including almost all of the Plan representatives, said that beneficiary/patient cultural norms sometimes create barriers for plans and providers in achieving high quality scores. For example, a Plan representative described the impact as follows:

> There are cultural issues that we've heard repeatedly with certain communities. Their income may not be as much of an issue. Whether it's health literacy, language issues, those sorts of barriers or just really cultural barriers to getting things like preventative medicines.

However, one of the Consumer representatives opined that disparities in quality performance among plans serving diverse cultural groups resulted not from barriers created by culture but from plans and providers delivering poorer quality care to diverse communities. Specifically, that key informant said,

> One thing that's been pointed to, is that certain communities seem to rate plan performance lower across the board. Certain ethnic communities and linguistic communities. Is that because… the plans seem to be quick to say that's because those communities have a cultural and linguistic bias. That's always going to result in low scores. But we ask whether it might be that those communities are getting less and poorer service from health plans and therefore, are reflecting that in the survey responses that they provide.

A few key informants identified race and/or ethnicity as associated with or a predictor of poorer quality care. Each of the key informants who identified race and/or ethnicity as a predictor of poorer quality also said that it would be inappropriate to modify the measurement methodology to, in effect,

accept racial or ethnic disparities. Further, several key informants remarked that the quality measurement system would be improved if it made racial and ethnic disparities more transparent to plans, regulators and consumers.

Many key informants discussed the higher prevalence of disabilities, behavioral health conditions and substance use disorders among low SES beneficiaries. For example, a Plan representative discussed the barriers that individuals in the DSNP plan he administers experience in obtaining care and adhering to treatment recommendations saying,

> 55% of our members have a mental health or behavioral health condition to go along with everything else that's wrong with them physically and to the extent that a successful treatment plan requires the patient to be a partner in care delivery there is a more likely chance that [they] will not partner up correctly or consistently to the same extent as regular Medicare Advantage plans.

Section 8.3.5 Impact of SES Characteristics by Type of Quality Measures

Key informants were asked whether they believed that patient/beneficiary characteristics had a greater impact on plan or provider performance on specific types of quality measures (such as process, intermediary outcome, or outcome measures). Several of the key informants' replies fell into more than one category meaning that they either identified more than one measure type (but not all measure types) or they identified a specific measure type and also commented that the impact was dependent on the specific measure.

The majority of all key informants, representing each key informant type, agreed that SES characteristics have a differential impact depending on the type of measure. This sentiment was reflected not only by a majority of all respondents but also by a majority of the Regulators, Plan representatives, and Thought leaders. For example, one of the Thought leaders described the various measure types as forming a continuum through which SES factors have a differential level of impact saying,

> They have more of an impact on measures that are interactions between patients and the healthcare system and on outcomes and relatively less association with straightforward process measures that are completely under the control of a provider. An example of that kind of a measure would be whether a lab test was checked. A more complex measure like was cholesterol controlled? There are a lot of different steps that need to be taken on both the part of the provider and the patient in order to achieve control and those are the types of measures where we observe greater disparities because in that type of a measure

> a provider would need to recognize that a lab value is out of a desirable range, have a discussion with the patient, initiate or intensify therapy. There are questions of adherence and being able to afford medications. Those are measures that require a number of steps, are usually the ones that have larger gaps according to race/ethnicity or socioeconomic status.

Key informants often had difficulty distinguishing between intermediate outcome and outcome measures, frequently identifying "outcome" measures as those which CMS categorizes as "intermediate outcome" measures such as medication adherence. While outcome measures alone were identified as being impacted by beneficiary/patient SES characteristics by a majority of key informants, including a majority of Provider representatives, Thought leaders, and Regulators, collapsing the two categories together, a substantial majority of key informants shared the opinion that SES characteristics have a greater impact on outcome/intermediate outcome measures than on other types of measures. A Plan representative described the impact this way:

> I think it probably affects both, but certainly as far as outcome, because with outcomes you're looking at control of your disease state, whether it's high blood pressure, diabetes, cholesterol or whatever. Then you've got to go way beyond process to understanding culturally. How do the members think? What are their values? What's their diet like? What are their beliefs? All that goes into quote "control", if you would, or like diabetes and high blood pressure, which is some of the heavily weighted star measures.

Section 8.3.6 Opinions Regarding the Current MA Stars Methodology

Twenty-five of the 30 key informants offered opinions regarding the current MA stars methodology. Nearly all expressed some level of support for the current methodology. However, only a few offered unqualified support for the program. The most commonly identified reasons for supporting the current methodology were that it creates incentives to improve quality and that it has resulted in efforts by plans and providers to assist beneficiaries/patients to receive appropriate care and to adhere to prescribed treatment. Similarly, some key informants noted that the stars system has resulted in improved plan performance over time. Several key informants expressed the view that the measures included in the methodology provide a broad overview of appropriate measures of quality. In addition, some the key informants argued that that the star ratings system makes it easier for consumers to understand differences in quality of care provided by different plans.

While only a small minority of key informants opposed the current stars methodology, a substantial majority expressed concerns about it. The primary reason for concern was that some of the metrics included in the stars methodology are beyond the control of the plans and providers being measured (described more fully in the section on SES). This concern was identified by at least half of every key informant type, except Regulators. Similarly, many key informants (including half of Plan and Provider representatives) expressed concern about the utility of the stars program when comparing the performance of plans that do not serve like populations. Many respondents were also concerned about the accuracy of the current measurement system. Some were afraid that the methodology incentivizes plans to focus their efforts on improving their performance on the metrics measured in the stars program rather than on improving overall quality of care (e.g., "teaching to the test"). Several respondents also noted the number and complexity of the measures and that the measures were not always in alignment with other CMS quality measurement programs creating abrasion between providers and plans regarding prioritization of quality measurement efforts. Finally, and in contrast to those supporting the stars program, several respondents opined that the stars methodology fails to produce meaningful data.

Section 8.3.7 Impact of MA Stars on Plan and Provider Willingness to Serve Low SES Beneficiaries/Patients

Key informants were asked whether payment incentives created by the MA stars methodology might encourage plans and providers to shy away from serving people with more SES risk factors. The majority of key informants, including a substantial majority of Plan, Consumer, and Regulator representatives and a majority of Thought leaders agreed that this was a valid concern. Reasons for this view varied. They included the difficulty of improving quality among low SES populations, the challenges of getting providers to agree to serve low SES populations and plan profit motives. In fact, some of the Plan representatives who agreed that this was a valid concern stated a belief that plans had already made changes in their service areas and product offering to avoid low SES beneficiaries. For example, a Plan representative said,

> I think if you were to do a study of DSNP closing, shrinking their service area in the past few years, and compared that to the number of DSNPs that have come on the scene and their geographies, you would come to the conclusion that certain zip codes have been unable to sustain a plan and the new ones have selectively chosen where to go. I think you could probably see patterns there if you went back and pulled CMS data on service area shut downs, service area expansions. You probably would have the evidence that yes these plans are very sensitive to location and zip code.

A few key informants expressed the viewpoint that avoidance of low SES beneficiaries was a potential concern, but not one that has been evidenced as yet. Some of the key informants, including a substantial majority of Provider representatives, believed that this was not a valid concern. Providers who felt this was not a concern argued both that providers have an obligation to serve their communities and that market dynamics would ultimately require that providers serve all beneficiaries regardless of SES.

Section 8.3.8 MA Stars Methodology and Improvement of Care Quality for Individuals in All SES Strata

Key informants were asked whether they believe that the current MA stars methodology improves the delivery of quality care to beneficiaries in all SES strata. Twenty-six of the 30 key informants responded to the question. None of the answers (yes/no/unsure) garnered the support of a majority of key informants. However, many of the key informants either said that the current MA stars methodology does improve quality in all SES strata or that they were unsure of the impact of the stars methodology across SES strata.

Thought leaders were the dominant key informant type among those who were unsure, largely stating that the data were not yet available to answer the question. For example, one Thought leader put it this way:

> There's a concern, as I said, we don't really have clear data on the impact of the Stars rating scale on those with low SES. The concern is that we know that enrollees with low SES are concentrated among a relatively small number of plans. If those plans are then penalized for their performance it would divert resources away from plans, or financially penalize plans, that have an important role in serving racial and ethnic minority beneficiaries or those with low SES. My concern, and I think concerns of policy makers, are that the Stars rating system might exacerbate disparities in care.

Section 8.3.9 Addressing SES-Factors that Create Barriers to Quality Measure Performance

Key informant opinions regarding whether plans and providers can effectively address or offset the SES factors fell into five categories:

1. Plans and providers can impact SES factors that create barriers to quality measure performance (e.g., unqualified support for the notion that plans and providers can address the underlying SES factors that create barriers);
2. Plans and providers can and are taking steps to impact SES factors that create barriers to quality measure performance but they cannot completely ameliorate those barriers;
3. Plans and providers can impact SES factors that create barriers to quality measure performance but their success is dependent on the resources they have available to address those factors;
4. Plans and providers can impact SES factors that create barriers to quality measure performance but need to do more than they are doing today if they are to be successful; and
5. Plans and providers cannot impact SES factors that create barriers to quality measure performance absent changes in quality expectations and additional resources.

The largest group of key informants said that while plans and providers can impact SES factors that create barriers to quality measure performance, plans and providers cannot completely offset them. This position was taken by representatives of four of the five key informant types. Only one key informant, a Plan representative, commented that plans and providers cannot offset barriers created by SES factors articulating the challenge as follows:

> The question is can plans and providers fix the problem? The answer is not without the resources. Just as the public school system cannot fix the problem that special education students present without the resources … No. See, you want health care to fix poverty. Why not instead expect health care to fix world peace and eliminate terrorism? Why not make that the goal of health care then if you think it's got that kind of capacity? I'm just saying again that we need to be reasonable in our expectations. Health care cannot fix poverty any more than the public school system can.

Some key informants remarked that plans' and providers' ability to offset SES related barriers to quality care is dependent on the resources available to those plans and providers. Additionally, while

some key informants, including many Consumer representatives, offered an unqualified yes to the question of whether plans and providers could offset SES factors, none of the Plan or Provider representatives responded with an unqualified yes.

Section 8.4 Strategies Plans and Providers Could Leverage to Offset SES Barriers to Quality Care

Consistent with the perspective voiced by nearly all of the key informants that plans and providers can impact, if not completely offset, SES-related barriers to care, key informants identified a number of strategies plans could use to address SES barriers. The most commonly identified strategies include refining care management techniques and processes, leveraging actionable data, addressing access barriers, and removing social barriers. In addition, respondents noted strategies that providers could undertake to address SES barriers. Each of those strategies is described in greater detail below.

Section 8.4.1 Refining Care Management Strategies

The vast majority of key informants, including a majority of each key informant type and all of the Provider and Plan representatives, recommended that plans and providers enhance their care management strategies. These recommendations include refining and enhancing care coordination and care management techniques, utilizing specialized tactics, such as community health workers or peer support, and increasing provider and staff training to ensure they understand the unique needs of low SES beneficiaries/patients. A Plan representative who recommended refining care management strategies to meet the needs of low SES beneficiaries described it this way:

> If I were to just try to generalize it, it's finding your member. Finding them, knowing them. Some enrollees, even amongst the full duals, some very low SES, some people are healthy enough and are in a safe enough environment, you don't need a face-to-face intervention. You can … do a quarterly or somewhat regularly telephonic intervention. You could be checking up with their doctor. You don't always need a super intensive intervention, but I think it's finding them, knowing who they are, so doing that care assessment, … it helps if it's usually in the house…Not necessarily that you need to always be face to face, but having it hands-on in the sense that you know your member and you know the community and you know what resources are available to them. Then the plan knows what interventions they have available to them. That's going to differ.

Section 8.4.2 Leveraging Actionable Data

More than half of the key informants identified the ability to leverage actionable data as important to effectively addressing SES-related barriers. Most of the Thought leaders, all of the Provider representatives, and a majority of Plan representatives discussed the importance of using data to effectively identify and intervene to offset barriers created by SES factors and to offset disparities in care. One Thought leader described it as follows:

> I think it's all about information and being able to drill down into that information, because if you don't know who to target you might know your overall rate is worse for this population, but that's a vastly complex population with different characteristics and profiles. You need to know which profiles of members are doing worse on which outcome measures so that you can really build intervention programs around that specific population if you're going to impact that high level rate and overall outcomes for that population. I'm a data person, so I'm a little biased, but it's all about having the right information at the right time.

In addition, some key informants, including most of the Provider representatives recommended that plans and providers refine their quality improvement techniques to address the needs of low SES beneficiaries. Specifically, they identified the need to segment and stratify data as a key component of refining those quality improvement techniques. A Provider representative described it this way:

> So from the provider perspective, I think just having a team lead or physician champion to really kind of be the lead on all quality improvement efforts within a practice. Having a good team that uses data in a way to really drive change. So they have a process in place, where they are frequently looking at performance outcomes and information from patients, patient experience outcomes, and using that to really look at where gaps are, where they're doing well, and then putting a plan in place. This is just kind of basic quality improvement methodology. I think those that are serving patients with lower socioeconomic status, they may fine tune their quality measures that they're looking at. They look at things to access to care, transportation, care management. They may change that a little bit based on the population.

Section 8.4.3 Addressing Access Barriers

Nearly all of the key informants recommended that plans and providers address access to care. Within this category some key informants made a general recommendation that plans and providers improve access to care, others encouraged plans and providers to improve access to transportation, and

many suggested that plans and providers leverage telehealth and assistive devices. In addition, some recommended that plans and providers modify care management, network and payment rules to deliver care where and how beneficiaries are able to receive it, for example, by utilizing street medicine programs, leveraging peer support and health coaches, and allowing for reimbursement of nontraditional providers and services. Others encouraged plans to address barriers created by out-of-pocket costs by eliminating premiums and lowering co-payments and deductibles.

Section 8.4.4 Removing Social Barriers to Care

A substantial majority of key informants recommended that providers and plans remove social barriers to care. A Thought leader described removing social barriers as follows:

> I think, they have the potential to address them but they need to develop effective partnerships with community or social service organizations that can address some of the issues related to housing, or transportation, or neighborhood safety, or food security, and access that may be important parts of people's overall health. We don't really have a system in place, right now, in the Medicare program to provide financial incentives for those partnerships to be formed. They're deeply rooted and challenging issues that the healthcare system, in general, has not, traditionally, addressed.

Common recommendations included increasing community partnerships, providing holistic services, and improving access to social supports. In this context, key informants described holistic services as those that address the full continuum of the beneficiary/patient's care needs including their needs for physical, behavioral and social services. For example, in speaking to the need for plans to provide holistic services, a Consumer representative described plans that are working with community based organizations to connect low SES beneficiaries to a wide array of necessary resources including prescriptions, food and respite care saying,

> There's an organization … that a clinician can write a prescription for community based services and [the organization] will help those folks or will help the individual connect with the resources to fill that prescription, whether it's for food, for respite care, for all sorts of things. I think we can invest in those sorts of services and payment models that will promote a more holistic approach to health.

Section 8.4.5 Provider Strategies

While each key informant recommended at least one strategy that plans can take to offset SES-related barriers to quality care, a smaller number recommended specific actions that providers could take to offset SES factors that create barriers to high quality care. Those recommendations included encouraging providers to accept more low SES beneficiaries, refining quality improvement methodologies and strategies, and modifying provider care delivery models.

Among key informants identifying these issues, several recommended enhancing provider networks to address the unique needs of low SES beneficiaries. Examples of recommendations in this category included increasing the number of language and culturally concordant providers in their networks and including providers with specific skills in serving unique subpopulations such as individuals with intellectual and developmental disabilities and individuals with behavioral health and substance abuse disorders.

Section 8.5 Changes CMS Could Make to MA to Address SES-Related Barriers to Quality Care

Section 8.5.1 Accounting for SES in Quality Measurement Separately from Accounting for Underlying Health Status

Nearly all of the key informants felt that it was appropriate to account for SES characteristics in quality measurement separately from adjusting for underlying health status. The majority of key informants recommended risk adjusting individual measures of quality, stratifying the plans by members/beneficiary SES and demographic characteristics in order to measure like plans against one another, or both risk adjustment and stratification. A few recommended accounting for SES separately from underlying health status but did not specify a methodology. Reasons for supporting stratification included: assuring that disparities in care were made transparent, providing actionable data to providers and plans in order to improve the quality of care, and providing sufficient data to meet the competing goals of implementing a fair performance incentive program and supporting effective quality improvement for all beneficiaries. Reasons for supporting risk adjustment included: helping to remove

possible negative incentives, and accounting for the inability of providers and plans to impact or control certain measures of quality. Speaking to negative incentives, one Provider representative said,

> You know, for looking at physician performance purposes, these factors need to be taken into account. There can be unintended consequences if [. . .]. These particular factors are not mitigated or at least adjusted, then there may be an unwillingness for physicians to treat these patients. That would be an unfortunate side effect for this [. . .]. You want to truly reflect what a physician, what their performance is. When there are factors that aren't taken into account that are outside of their control, that doesn't accurately represent their performance.

Speaking to provider and plan impact or control of certain measures of quality, a Provider representative explained,

> . . . when you're talking about outcome measures and using those outcome measures in a comparative way across hospitals, it's important that those measures account for all of the factors that are beyond the control of a provider but that might impact the outcome. For something like mortality, the biological truth, is that patients who are older are more likely to die. That's why these outcome measures have an adjustment for age. It's not because older patients should somehow be expected to have less quality care, it's simply because of their biology they simply are going to look different on certain things. Patients who have multiple chronic conditions or other underlying factors, you would certainly want to try to adjust for those because the patient would arrive under a hospital's care with those things. They wouldn't necessarily be caused by hospital care. We think that SES kind of functions on a similar principal… There absolutely is a limit to the influence that a hospital has over some of the broader socioeconomic conditions in their communities. So, in order to level the playing field among providers, you have to have that kind of adjustment.

Among key informants supporting risk adjustment or risk adjustment together with stratification, several, including a substantial majority of Provider representatives, remarked that risk adjustment should be applied only to outcome measures, while many key informants commented that the need for risk adjustment should be assessed on a measure-specific basis regardless of measure type (e.g., process, outcome, intermediate outcome). One of the Thought leaders described the issue as follows:

> SES adjustment factors [are] probably less needed for process, but I believe they are needed, and I actually think that's a fruitful area for research to determine how much process measures can be affected by SES. I've just presented some hypotheses about how it might be affected with the scenario of nobody else at home so the patient can't get to their screening tests, but I don't know how all of these things combine in the real world... I think it's a very important area for research.

Among the key informants who recommended that the application of risk adjustment be determined on a measure by measure basis, some referenced the NQF report's recommendation that risk adjustment be

used only when there is a conceptual basis for its application and an empiric association between SES and the variable of interest.

Key informants who recommended applying both risk adjustment and stratification argued that doing so will assist in both leveling the playing field between plans and assuring that meaningful comparisons can be made between plans and providers with different proportions of low SES membership. One Thought leader noted,

> I'm specifically talking about risk adjustment of the quality measures to level the playing field so that you are comparing apples to apples so that you can really gauge the true performance of plans. That not only includes adjusting for socioeconomic characteristics like living in a high poverty area, but it also means adjusting for other characteristics of disadvantaged members like dual-eligible members that have much higher prevalence of disability, of mental health conditions like alcohol, drug, substance abuse, of chronic conditions in general, compared to non-disadvantaged or non-dual eligible members.

A few key informants supported the use of stratification while opposing the idea of risk adjustment. Key informants who supported a stratification-only approach argued that stratification would improve the fairness of the program, and would provide greater transparency to assist consumers and regulators in identifying health disparities while not masking health disparities. In their view, risk adjustment would create a system which accepts poorer quality care for low SES populations by masking health disparities.

The primary concern raised regarding the use of risk adjustment to account for the impact of SES factors on quality measure performance, raised by several key informants, was the concern that doing so would mask health disparities effectively resulting in an acceptance of poorer quality care for low SES populations. Additional research was recommended by a Consumer representative who put it this way,

> . . . I think also probably the more important concern is that we do worry about masking healthcare disparities. And so if you adjust the measures, I think what we have a hard time with is how do you ensure that you don't effectively create two different levels of care? Like how do you actually ensure that the quality of the care for lower income individuals is the same as the quality for higher income individuals if you effectively adjust out that difference? . . . I think we're comfortable with the idea of comparing plans by peer groupings so stratifying the different plans. So plans that disproportionately serve low income people, grading them against one another as opposed to plans that serve higher income people. So I think our feeling is if there is a true connection socioeconomic status and the ability of plans to achieve high quality ratings then there's a variety of solutions that we should be exploring and they don't just include risk-adjusting the measures that we really need to think about what are the risks of doing that. And will we be masking disparities and are there other ways to effectively achieve the end-goal

> which is ensuring that plans still want to serve those populations. Because we certainly don't want to kind of create weird incentives where plans want to avoid certain areas or avoid serving certain populations of people.

Section 8.5.2 Recommended Changes to the Stars Methodology

Each key informant was asked to recommend changes, if any, to the MA stars methodology that they believed would help to ensure the highest quality of care is delivered to low SES populations. In addition to the already discussed recommendations regarding accounting for SES factors in quality measurement, key informants recommended a wide variety of changes to the stars methodology, although there was little consensus on the specific recommendations. The most common suggestion was to include more meaningful measures, including some that focus attention on quality for specific populations (including those with low SES). Key informants who recommended that the stars methodology include more meaningful measures directly related to SES barriers suggested that the stars measure set include measures related to cultural competence, language access, benefit design, member connection or engagement, care management, chronic disease/disability and access to care. For example, a Plan representative made the following recommendation:

> I do think the field needs to give serious thought to what do we really value with the SES group? . . . I'm not sure that we have our finger on what we really value with DSNP programming. I think we value just a contact, a rate of contact. So many of these folks are difficult to contact…Just basic engagement is a value that has outcome and health care, population health implications and yet it's just presumed. Contact is presumed and not rewarded in the current system. I think you've got to start from some more basic levels. It's not about blood pressure control. It's about contacting the member at all and then maintaining contact. Those more fundamental things need to be part of the correct quality measurement system for a DSNP plan which are typically inner city plans. I want to go there. Contact, showing up for an appointment is kind of [a] fundamental quality measure that a plan is doing the right thing.

Similarly, a few key informants, none of them Plan or Provider representatives, recommended changes be made to the stars methodology in order to focus attention on quality for specific populations including low SES beneficiaries as means of reducing health disparities. For example, a Thought Leader said,

> We certainly found some evidence that some Medicare plans provide a relatively uniform level of quality across their different patient subgroups, whereas others tend to have more differences between those in worse or better health status or those in worse or better

> socioeconomic status. Building in some features in the stars system that are specifically oriented toward identifying, measuring, and then incentivizing the solution of the disparities in care or disparities in outcome that are related to SES would be an "attention getter" towards more broadly introducing those methods and features into healthcare and into the way the health insurance plans operate. That would be beneficial to those groups that are doing badly.

Several key informants recommended focusing more on quality improvement rather than on achievement of targeted benchmarks. A Thought leader expressed the issue as follows:

> Well I have a problem with the tournament notion that everybody's competing with each other. I would be much happier if we used an improvement method. One of my observations from my brief knowledge of the star rating is that a MA plan's performance has a high correlation with the performance of the underlying delivery systems in different geographic areas so that the star rating . . . I understand that some of the measures have to do with what's internal to the organization and so that's not a factor, but other measures depends on what the providers at the MA plan is contracting with or in some rarer cases employing. That creates in some ways an unfair competition. If you have a plan that's a 5 star in an area where all the other plans are 3 star, that plan strikes me as doing something different dramatically better or different than an area where all the plans are 5 star because that might mostly reflect what the providers are doing….so I'd be looking for either regional comparisons rather than national ones, or I would be looking for a pure improvement model where we even had 2 star plans get bonuses if they increased to 3 and 4 stars where in fact you wouldn't even use the star rating system… I'm willing to give up some of the use of star ratings for consumer choice in order to have every MA plan improve quality.

While this recommendation was made by several Regulators and Plan representatives and a majority of Thought leaders, not a single Consumer or Provider recommended realigning the methodology to focus more on improvement than achievement.

A few key informants, including half of Plan representatives, recommended that the penalties attached to the stars program be removed. These comments generally focused in two areas: the fairness of penalizing plans for performance issues outside of their control and, aligned with recommendations previously discussed, to incentivize plans to take on hard to serve populations.

Among the other recommendations, half of Provider representatives recommended that CMS align measures across all Medicare quality programs to ensure that all actors in the system are coordinating and collaborating to improve overall quality. A few key informants (including half of Plan representatives) suggested that the stars methodology be applied at the plan benefit package level, rather than at the level of the contract between CMS and the plan sponsor, to account for significant variances in

contract sizes and geographies. These key informants expressed the concern that smaller and/or geographically limited contracts are disadvantaged under the current methodology when compared to larger, more diverse contracts. For example, a Plan representative said,

> When it comes time to assign 5 star scores it's to the contract not to the plan but if they scored the plans separately, I wonder how many then would ever be at a 4 or 5 star level? The reason many of them are at 4 and 5 star level is the DSNP is blended into a larger Medicare Advantage plan that enrolls well elderly and so the smaller DSNP members are actually averaged up in the contract and we're led to believe that they're performing maybe at a high level when in fact as a separate section of the contract they aren't but we'll never know. That averaging up effect is potentially distorting. If we were to take all the DSNPers and okay what's their 5-star score, standing on their own without being averaged up into the contract, we might be seeing a different picture…

Section 8.5.3 Changes to the MA Program Outside of the Stars Methodology

Nearly half of the key informants identified structural or policy changes to the MA program that they believe would assist plans and providers to address and/or offset SES factors that create barriers to quality care. Key informants who made these recommendations included a majority of Plan representatives and Providers, a substantial proportion of Thought leaders, and a few Regulators and Consumers. Additional structural changes recommended by more than a few key informants were creating positive financial incentives to encourage plans and provider to serve high risk populations, changing the rules regarding supplemental benefits to allow plans more flexibility to meet the unique needs of low SES beneficiaries, and aligning quality measures across Medicare programs.

Section 8.6 Are Plans Tailoring Their Practices to Meet Beneficiary SES Needs?

As discussed in the methods section, as originally designed, the key informant questionnaire included three supplemental questions which were to be asked only of individuals with significant experience in plan and provider practices. After the first 4 interviews, it became clear that key informants in other categories also had significant experience with plan and provider practices. As a result, beginning with interview 5, each key informant was offered the opportunity to answer the supplemental questions. In the end, 6 of 30 key informants (4 Thought leaders, and 2 Consumers) did not answer the 3 supplemental questions. Another way of saying this is that 24 key informants (2 Consumer

representatives, 9 Regulators, 3 Thought leaders, 4 Provider representatives, and 6 Plan representatives) responded to the supplemental questions.

Among the key informants who were asked whether plans should be tailoring their practices to meet the needs of low SES beneficiaries, a substantial majority said they should. Specific recommendations included: creating and implementing culturally specific communication strategies; measuring disparities within their own patient population; conducting in person assessments; care planning and care management; targeting high-risk, high-resource utilization patients proactively with multidisciplinary home visits; focusing on transitions of care using dedicated and specially trained staff; screening for the SES factors that impose barriers to access to care in order to identify resources to improve access; engaging in targeted outreach in order to establish a meaningful and longitudinal relationship in order to assist beneficiaries/patients to engage in healthier behaviors; and working with and through community organizations that have the trust of the beneficiaries/patients. Among those key informants who expressed concern regarding plans tailoring their practices to meet the specific needs of their beneficiaries/patients, the most commonly cited concern was that tailoring might be used to discriminate against certain types of beneficiaries.

These key informants were also asked whether they had observed an increase in population tailored strategies since the implementation of the MA stars methodology. The vast majority said they had, but that the type of variation and extent to which plans are tailoring their practices differ greatly.

Key informants who said that they had observed population tailored strategies were asked to provide examples of best practices they have observed among plans and providers in implementing population tailored strategies. Identified best practices often echoed recommendations made earlier in the interviews regarding mechanisms to overcome SES factors that form barriers to care, including partnering with community organizations, assuring culturally competent and language concordant care, developing personalized care management programs, assisting with housing issues, developing service delivery systems targeted to subpopulations (many of who are low SES) including beneficiaries with ID/DD and chronic mental illness, leveraging data and technology solutions to identify utilization patterns and target

gaps in care, developing incentive programs to improve patient activation and adherence, and utilizing health coaches. Table 5 provides examples of some of those strategies as described by the key informants.

Table 5. Best practices in population-tailored strategies

Strategy	Informant feedback
Working with and through community organizations that have the trust of the beneficiaries/patients	"I know of a plan, for instance, that contracts with an organization… [that] is all about providing community based organization provides basically food as medicine. They provide meals to people with chronic conditions that are specifically made to meet their dietary needs. I know of a plan that serves dual eligibles that contracts with them so that certain of their members get those meals. I think housing is a really bright new area for people to get into. People can't follow the protocols, their medication or treatment protocols unless they have a safe place to, for instance, keep their medication or to get the proper rest that they need. I think that there's lots of ways and opportunities to do better in this regard." –Consumer Representative
Provider/Patient language and cultural concordance	". . . the plan engaged somebody from that community who was … also a physician to go into the community and to call homes and other places to talk with people to try to break through some of those cultural barriers and explain how critical it is to do some of those things." –Plan representative
Personalized care management programs	"So for those members who … have Medicaid and Medicare services in the same plan, they've assigned … a Healthcare Buddy. Healthcare Buddy is not a clinician. It's a member services team member. And that Healthcare Buddy is kind of a point person for the member. So what they've done is they've taken a picture of the buddy, send him a letter with a picture of their buddy and that's their person. So when they call for help, "Oh, where is the pharmacy closest to me?" They call their buddy. If they need to see a cardiologist, because their PCP suggested it, they just call their buddy and their buddy can help them. So it's truly kind of making that connection… That's just essentially a kind of a concierge member services person that really is kind of the point person for questions." –Regulator
Housing support programs	". . . have been using the money for a certain set of their population on supportive housing. What they're doing is working with their case managers to identify people who have been placed in long term care for a certain period of time and otherwise should be somewhere else but don't have stable housing to return to or if they've been in skilled nursing and they're about to lose their housing. They've hired someone to work with them that helps either to secure Section 8 housing or make some modifications to the home so the individual can return home or gets them… into a residential care facility for the elderly with proper case manager support. I think that that is an example of where both plans and providers are starting to tailor specific customized approaches either based on the geographic area…so they're right at the center of that issue." –Regulator

Strategy	Informant feedback
ID/DD-specific care management programs aligned with specially trained provider	"We have worked closely with organizations serving both children and adults with developmental disabilities. A lot of the adults are duals and that involves hiring specialized staff so we have a nurse case manager who specializes . . . who's very familiar with the population. We've hired a physician who does visits. Many of them live in group homes so visiting folks in their group homes. We've set up a [. . .] specialized mental health clinic because many have behavioral issues. They can't really mix with the general mental illness population and so they need sort of a targeted approach so we have a two day a week clinic focused specifically on their needs. It's just another example of a program tailored to a particular population." –Plan representative
Meeting non-medical-care needs	"I've heard stories of plans going and finding homeless members under bridges to give them their diabetes shots, medications. Going to their homes and buying a microwave for them or a refrigerator, or making sure their electric bill is paid. They do not get reimbursed for that. They do it because they obviously want to provide a high quality of care to their members, but they certainly also do it because they need those dollars from the star program and their quality ratings to reflect the care that they provide." – Thought Leader
Health coaches	"We are experimenting with health coaches and these guys are getting our resisters. Resisters to us means this lady has never been in the mammogram numerator for the past three years. These coaches don't do anything other than try to befriend the member to understand why they don't want to show up in the numerator ever. What's the deal? I think we're getting penetration. We're at least understanding what's the source of their resistance. It could be something silly, easily overcome…I think going into these environments with a spirit of discovery, no accusation, no treatment, what's the deal why is this happening? I just want to understand, has a way of leading to its own solution." –Plan representative

Section 8.7 Summary of Findings: Recurrent Themes

While there was almost unanimous support for the use of quality measurement in MA that support did not translate into unqualified support for the Medicare stars system. The vast majority of key informants expressed some level of support for the current methodology but only a few offered unqualified support. The most commonly cited reasons for supporting the stars program were that it creates positive incentives to improve the quality of care and that it takes complex information and simplifies it in a manner that is comprehensible to consumers. The most commonly identified concerns

about the stars methodology are the inclusion of metrics beyond the control of plans and providers and the inability under the current methodology to compare the performance of plans serving like populations.

A significant majority of key informants do not believe that health plans and providers can ensure equivalent care quality for all beneficiaries. Nearly all of the key informants expressed the belief that certain beneficiary/patient SES characteristics pose barriers to plan and provider performance on some or all quality measures. However, opinions regarding which SES characteristics pose barriers varied by key informant, and in some cases, by key informant type. Only a few key informants voiced the view that plans and providers can offset these barriers. Many said that while plans and providers cannot completely offset these factors, they can positively impact them.

Key informant opinions were divided on the subject of the effectiveness of the stars methodology in improving the quality of care for beneficiaries in all SES strata. Among the 26 key informants who responded to the question, some believed that the stars program improves care for beneficiaries in all SES strata, some were unsure of its effect across all SES strata, several said that the stars methodology does not improve care for beneficiaries in all SES strata.

The majority of key informants agreed that it was valid to be concerned that the stars methodology might encourage plans and providers to shy away from serving people with SES risk factors due to the potential for negative payment consequences. A few key informants believed that while a valid concern, it was not a phenomenon that had, as yet, been evidenced.

Nearly all of the key informants agreed that it was appropriate to account for SES characteristics in quality measurement separately from accounting for underlying health status. The majority of key informants recommended either that the individual measures be risk adjusted or that the measures be risk adjusted and that plan performance on quality measures be stratified to allow for comparison of quality performance among plans serving like populations. Key informants suggested other changes to the stars methodology and the MA program rules to assist plans and providers to address and/or offset SES factors that create barriers to quality care.

While many key informants gave suggestions about how the MA stars methodology or the MA program rules could be changed, a substantial majority also expressed the belief that plans and providers should tailor their practices to the needs of the beneficiaries/patients they serve and recommended a variety of strategies for doing so.

Seven themes recurred throughout the 30 interviews: fairness, control, breaking down silos between plans and providers, resources and/or resource limits, barriers formed by a paucity of available and actionable data, geographical differences in care quality and resource availability, and the role of plan attributes in quality performance with low SES populations. These themes (described below) cut across key informant types and across the questions posed to key informants.

Section 8.7.1 Fairness/Equity

Arguments regarding the fairness or equity of the current methodology were raised repeatedly in response to several of the questions and by a majority of key informants of all types. Fairness-related themes included the tradeoffs involved in fairly judging the quality of the care delivered by plans while utilizing an objective measurement system, concerns regarding creating a two-tiered system and/or masking disparities through the application of risk adjustment, the fairness and appropriateness of including measures of quality that are largely outside of the control of providers and plans, and whether the current system incentivizes plans to actually improve the quality of care or merely to focus on improving performance on the measured outcomes and processes. The majority of key informants expressed concern that an unfair measurement system would adversely impact plan and provider compensation, which would then result in fewer resources to address SES barriers. A few Plan representatives also remarked that the threat of diminished resources attributable to lower stars performance creates disincentives to plans offering DSNP plans.

One of the most commonly articulated themes was the fairness of holding plans and providers accountable for things that are outside of their control. Half of key informants spoke to the issue of plans' ability to control the circumstances of their patients, the providers delivering care and the communities in which they operate. These issues were identified by key informants representing every key informant type

and at least half of Thought leaders, Provider representatives, Plan representatives, and Consumers. More than half of key informants also raised the issue of the fairness of holding providers responsible for things outside the provider control. Among those who raised the issue of provider control were the substantial majority of Thought leaders and Provider representatives, many Plan and Consumer representatives, and several Regulators.

The context in which key informants raised the issue of control varied. Most frequently, remarks regarding control focused on the fairness of holding a plan or provider accountable to deliver either equivalent outcomes or equivalent quality. Several of the key informants raised the issue of control in the context of recommending changes to the stars methodology. For example, a Provider representative expressed the concern this way,

> I think there is some concern that [. . .] I think in general, for pay for performance programs [. . .]. That there's some concern that when a physician has a patient population that has a lower SES that there may be unintended consequences of measuring performance without adjusting for those factors. When a physician is compared to a peer that is not seeing a similar patient population, it puts that physician performance and compensation at risk. Also, it's not fair to compare him to someone else that's not seeing a similar patient population. I think that we're really concerned about not necessarily that the patients are receiving a different level of quality, but that there are factors that are largely outside of this patient's control that do impact health.

Other key informants spoke to plan and provider control in the context of patient and provider autonomy. In discussing whether plans and providers can guarantee equivalent quality for beneficiaries in all SES strata, one provider expressed the concern that to do so, plans would have to become more prescriptive than is appropriate, limiting providers' ability to address the needs of each individual patient. A Plan representative, discussed the conflict between plan and provider engagement and patient autonomy saying that equivalence was only possible in a completely patriarchal society in which the health plan or provider completely take over care decisions for the beneficiary.

A corollary to the provider and plan control issue, several key informants raised the issue of the plan's and provider's role in breaking down SES barriers to care. These key informants concluded that while the provider clearly has a role in breaking down SES barriers, the activities required to effectively

break down SES barriers are shared between the provider, plan, and other community actors. A Thought leader put it this way:

> Let's talk first about the provider of care, I think there's certainly things they can do to try to close the gap, but I think that [. . .]. As you think about broadening the range of things that they do, they stop acting as providers and have to start acting as advocates and maybe as organizers. And then it's not obvious whether the provider role has to be same. To try to make that a little more concrete, maybe you have a population in which there's a lot of diabetes, which tends to be associated with low SES. You can try to improve A1C testing. You can get patient … navigators … who help people to go through the process of getting tested and developing a dietary plan, an exercise plan, and so forth. Even that is getting beyond the pure sort of doctor in the office role. These are things that healthcare organizations can do and should do and one would hope that reimbursements would be made more aligned with the importance of doing those things for those populations.

Section 8.7.2 Financial Stressors/Resource Limitations

Another recurrent theme was the impact of financial stressors/limitations on plans' and providers' ability to offset SES characteristics identified as barriers to quality care. This theme was identified by a substantial majority of key informants (including each key informant type) in response to a wide variety of questions. Clearly of most salience to Plans, Providers, and Regulators, it was raised by all of the Plan and Provider representatives and a majority of Regulators. Resource constraints were identified as a barrier to effectively addressing health literacy challenges, improving access to care, delivering supplemental benefits needed by low SES beneficiaries, and improving patient activation and engagement.

Section 8.8 Breaking Down Silos

Finally, several key informants raised the issue of systematic silos and the impact of those silos on the ability of plans and providers to improve performance on the Medicare stars quality measures. These key informants focused their comments on the need for all actors in the health care system to work together to improve health outcomes for low SES populations. For example, a Regulator said,

> I think one of the issues we currently have in our current system of assessing provider and health plan performance is everything is very siloed. Somehow the idea that just the health plan or just the provider or just the physician or just the nurse could make a significant difference, is hard. I think it's got to be much more of a collective effort on the part of the community and the providers to make a difference. That can only really be done through efforts that cross the different silos and don't focus so much on what a

> health plan can do…. if you think about the Medicare plans, for example, so much of the emphasis of the stars is on adherence. How much can a health plan truly do to impact adherence? There's a fair amount a clinician can do. If I work hard enough I can get somebody to be more compliant. If I'm not really engaging them where they live, where they work, with their family, I'm not going to make the kind of progress you really need to make.

Section 8.9 Summary of Results by Key Informant Type

Plans and providers were generally focused on the reputational and financial impact of the stars program, with the vast majority expressing concerns about the fairness of the program as currently designed. Plans and providers were more likely to state that SES barriers could be impacted, but not completely offset and that the ability to offset them was resource dependent. Provider representatives differed from other key informant types with the vast majority stating that the concern that plans and providers would avoid low SES beneficiaries as a result of the stars incentives was unrealistic.

The majority of Consumer representatives expressed support for the current program and, when they made recommendations for improvements to the program, those recommendations generally focused on assuring that the measures are meaningful to beneficiaries/patients. Consumer opinions split on the issue of tailoring strategies to specific populations as Consumers balanced concerns about discriminatory practices with statements regarding individual consumer goals and values. Both Consumer representatives and Regulators focused on the utility of the stars program to inform consumer choice by effectively distilling large volumes of complex information into an understandable format.

The majority of Regulators supported the current stars program while recommending that changes be made to account for SES. The majority of Regulators recommended that stratification or risk adjustment in combination with stratification be used to account for SES factors. Regulators often focused their comments on the methodological soundness of the measurement program and on its ability to effectively inform consumers about the quality of care being delivered by plans and providers. Several Regulators discussed the need to balance fairness in measurement with the goal of improving the quality of care for all beneficiaries. One Regulator expressed the concern that were penalties for poor quality

performance to be removed, the revenue earned by low performing plans would go to plan profits rather than to improving the quality of care.

Thought leaders were more varied in their views. Several Thought leaders focused on the availability of data in order to inform opinions regarding the impact of SES on quality measure performance and on the use of data by plans and providers to offset barriers created by SES factors. A substantial majority of Thought leaders expressed the view that it was appropriate to account for SES factors separately from underlying health status with the majority supporting either the use of risk adjustment or risk adjustment in combination with stratification. Thought leaders consistently expressed concern regarding plans' and providers' ability to control the results of some or all of the metrics included in the stars methodology and the effect that this lack of control has on quality measure performance.

Section 8.10 Common Policy Suggestions

A summary of the policy changes commonly recommended by the respondents is included in Table 6. Several frequently recommended changes focused on improving the accuracy of the MA stars program in assessing the quality of care delivered by MA plans to low SES populations. They included accounting for SES separately from underlying health status using one of four methodologies: risk adjust all the measures for SES; risk adjust individual quality measures only when there is a conceptual basis for the application of risk adjustment and an empiric association between SES and the variable of interest (as recommended by the NQF special committee); stratify performance on the stars measures to compare like plans; or apply both risk adjustment and stratification. Additional MA stars-focused recommendations included: changing the MA stars measures to focus on measures within the plan or provider's control; changing the MA stars methodology to align the measures with the measures applied in other Medicare quality measurement systems (such as hospital compare and the hospital readmissions reduction program); measuring performance at the benefit plan-level rather than at the contract level; focusing more on quality improvement than achievement of targeted benchmarks; removing penalties for low performance until the issue of accounting for SES in the MA stars program is fully resolved; and selecting

quality measures which are meaningful to low SES populations. Measures identified as meaningful to low SES populations included measures of cultural competence, language access, access to care and member engagement.

With respect to policy changes that key informants believed would improve the quality of care delivered by MA plans to low SES populations, more than a few key informants recommended: encouraging plans to: enhance care management strategies; leverage actionable data; provide certain supplemental benefits such as transportation, telehealth, and meals; develop community partnerships to remove social barriers; implement culturally/linguistically concordant communications strategies; contract with specially trained providers; and implement care management strategies that focus on patient activation and adherence. Others recommended that plans be required to take these same steps.

CMS focused policy recommendations largely related to improving the quality of care delivered to low SES beneficiaries outside of the MA stars methodology. These recommendations included requiring CMS to change regulations governing nondiscrimination to allow MA plans more flexibility to target supplemental benefits to meet unique needs of low SES beneficiaries; varying MA payment rules to allow more flexibility in spending to deliver services or to utilize settings that are not covered under the traditional Medicare program; and increasing compensation to MA plans serving low SES beneficiaries so as to provide sufficient resources to offset SES barriers to high-quality care.

Table 6. Common policy suggestions

Improvements to the Stars Program	• Accounting for SES separately from underlying health status using one of four methodologies • Risk adjusting all the measures for SES • Risk adjusting individual quality measures only when there is a conceptual basis for the application of risk adjustment and an empiric association between SES and the variable of interest • Stratify performance on the stars measures to compare like plans • Applying both risk adjustment and stratification. • Changing the stars measures to focus on measures within the plan or provider's control • Changing the stars methodology to align the measures in the stars program with the measures applied in other Medicare quality measurement systems • Measuring performance at the benefit plan-level rather than at the contract level • Focusing more on quality improvement than achievement of targeted benchmarks • Removing penalties for low performance until the issue of accounting for SES in the stars program is fully resolved • Selecting quality measures which are meaningful to low SES populations.
Plan Actions Recommended to Improve the Quality of Care for Low SES-Populations in MA	• Encouraging plans to: enhance care management strategies; • Leveraging actionable data; • Providing certain supplemental benefits such as transportation telehealth, and meals • Developing community partnerships to remove social barriers • Implementing culturally/linguistically concordant communications strategies • Contracting with specially trained providers • Implementing specialized care management strategies focused on patient activation and adherence
Programmatic Changes to the MA Program	• Requiring CMS to change its regulations governing nondiscrimination to allow plans more flexibility to target supplemental benefits to meet unique needs of low SES beneficiaries • Varying MA payment rules to allow more flexibility in spending to deliver services or to utilize settings that are not covered under the traditional Medicare program • Increasing compensation to plans serving low SES beneficiaries so as to provide sufficient resources to offset SES barriers to high-quality care.

Section 8.11 Notable Items Not Mentioned by Key Informants

Despite the large body of literature on the issue of the influence of socioeconomic and demographic characteristics on quality performance and the substantial activity on this issue by CMS, ASPE, MedPAC, Congress, NAM and NQF, nearly all of the key informants expressed support for quality measurement in Medicare and at least some level of support for the stars methodology.

In addition, while many of the key informants spoke to resource limitations, none spoke directly to the cuts to the MA program made in ACA and ATRA. Resource constraints were described in general ways but without great specificity. Some key informants discussed the continued viability of MA in certain geographies. However, other than CMS's risk adjustment methodology which was frequently mentioned, specific aspects of the way MA rates are set and plan and provider specific financial issues were not addressed. Also of note, while there has been an enormous amount of advocacy with CMS and before Congress on the issue of the caps placed on quality incentive revenue in on some historically high cost counties under the ACA, this issue was similarly not raised.

Section 8.12 Limitations

As with any qualitative study, these results reflect the views of the 30 individual key informants interviewed. While these key informants were selected to represent 5 distinct key informant types, these results are informative but as limited in their generalizability. Each key informant's views likely reflect their personal and professional experiences and biases. Plan and Provider representatives are likely influenced by both the reputational and financial impact (positive or negative) that the stars methodology has had on them or the people they represent. Thought leaders' comments are likely influenced by their research and experience and the research and experience of their peers. Regulators are likely biased by the performance they have observed among plans and providers and by the efforts that they have undertaken to balance the need for improvements to the program with available financial resources and statutory and regulatory authorities.

Finally, Consumer representatives are likely biased by their desire to have the highest quality, most robust MA products available to consumers perhaps without regard to the attendant costs to government or the operational and financial impact on plans and providers.

CHAPTER 9: MULTIVARIATE ANALYSIS OF PLAN BENEFIT PACKAGES

Section 9.1 Introduction

Phase 2 of this study examined the impact of the 2014-2015 transition out of the MA stars quality bonus demonstration program to the full imposition of the ACA stars payment incentives on plan product designs. Plans may modify their service areas and benefit packages for any number of reasons including market strategies and financial considerations. If, consistent with the majority of phase 1 key informants, MA plans believe that the SES characteristics of plan participants impact plan performance on the measures included in the stars quality measurement program, it is possible that the substantial increase in the rewards and penalties associated with the MA stars program which occurred at the end of 2014 could have spurred changes in MA plan benefit packages. This phase of the study tested the hypothesis that plans with a greater proportion of low-income beneficiaries and those offered in counties with greater levels of deprivation would be more likely to include supplemental and enhanced benefits identified by phase 1 key informants and informed by a scan of the literature as likely to offset SES-related barriers to high-quality care. In addition, this phase of the study tested a secondary hypothesis that as plan revenue decreased among plans performing below four stars due to the transition out of the Medicare stars quality bonus demonstration program, supplemental and enhanced benefits identified by phase 1 key informants and informed by a scan of the literature as designed to offset SES-related barriers to high-quality care also would be reduced.

MA plans must bid to provide all Medicare part A and B services. The amount of the plans' bid may not exceed the benchmark set by Medicare for the county in which the plan is offered. Supplemental and enhanced benefits in excess of those covered in parts A and B may be offered but if the cost of those supplemental benefits exceeds the benchmark, the amount by which they exceed the benchmark must be charged to the beneficiary as a premium up to a capped allowable maximum out-of-pocket cost (*Advance*

Notice of Methodological Changes for Calendar Year (CY) 2015 for Medicare Advantage (MA) Capitation Rates, Part C and Part D Payment Policies and 2015 Call Letter, 2014). Many of the phase 1 key informants discussed the negative impact of out-of-pocket costs on low SES patients' adherence with prescribed care. In addition, Atherly and colleagues (Atherly, Dowd, & Feldman, 2004) estimated the effect of Medicare+Choice (M+C) plan premiums, benefits and individual beneficiary characteristics on the probability of enrollment in a Medicare+Choice plan. They found that beneficiaries were responsive to plan characteristics and that premiums have a significant effect on plan selection. Similarly, Reid and colleagues (Reid, Deb, Howell, & Shrank, 2013) separately looked at the impact of the star ratings and cost to the consumer (out-of-pocket cost plus premium) on beneficiary plan selection behavior, finding that cost to the consumer explained nearly three times the variation in plan selection behavior than was caused by plan star ratings. While copayments and other out-of-pocket costs are filed for each plan benefit package individually by covered service, the presence or absence of a premium is a binary variable, for example, the plan either charges a premium or they do not. As a result, the presence or absence of a premium was included as a dependent variable as a proxy to test the impact of the proportion of low SES beneficiaries and county-level deprivation on whether a plan offering included a patient out-of-pocket cost requirement.

In 2014 MA plans could provide the following supplemental education/health management program options: health education, nutritional benefits, additional smoking and tobacco use cessation, membership in a health club/fitness classes, nursing hotline, enhanced disease management (EDM), telemonitoring, and Web/phone-based technology. Many phase 1 key informants discussed the importance of care and case management on offsetting SES-related barriers to high quality care. While care management is not offered as a supplemental or enhanced benefit, enhanced disease management (EDM) programs are. A large body of literature exists regarding the efficacy of disease management programs (Greenapple, 2011; Mattke, Seid, & Ma, 2007; Rosenzweig et al., 2010). The results of these studies are largely mixed (Holz-Eakin, 2004). In examining the attributes of those disease management programs that show evidence of efficacy, Mattke and colleagues concluded that those disease

management programs that were efficacious focused on the use of case and disease management for high risk populations (Mattke et al., 2007) and were paired with other care improvement techniques (Greenapple, 2011; Mattke et al., 2007).

> . . . across all conditions except asthma and COPD, there is consistent evidence that disease management can improve processes of care (e.g., increased A1C screening for persons with DM). The results of the studies suggest that improved clinical care seems to lead to better intermediate outcomes and improved disease control (such as lower A1C levels in persons with DM), which was demonstrated for CHF, CAD, DM, and depression. (Mattke et al., 2007)

Based on this research, as well as the recommendations of many phase 1 key informants, phase 2 included EDM as a dependent variable.

A large majority of phase 1 key informants spoke to issues of food insecurity and lack of access to fresh, healthy foods. A few key informants also spoke to the impact of ethnic dietary patterns on certain quality outcomes, particularly maintenance of blood pressure in people with hypertension and maintenance of blood sugar in diabetics. Cho and colleagues studied the impact of meals on hospital readmissions. They found that of clients of a single site meal delivery program reporting data at 3 months after discharge, 75.3% had no additional hospitalizations and 89.9% of clients had no additional emergency department visits. Among those clients reporting data at six months, 80.4% of clients had no hospitalizations and 90.2% had no emergency visits. This is less than would be expected based on the demographic and health conditions of those clients (Cho, Thorud, Marishak-Simon, Frawley, & Stevens, 2015). Muscaritoli and colleagues (2016) conducted a Cochrane systematic review of the literature and examined whether nutritional therapy is cost-effective among patients treated both in an inpatient and outpatient setting. They found that nutritional therapy was consistently found to be cost effective. Based on the consistent identification of food and nutrition as SES-related barriers to high quality care by Phase 1 key informants both meals and nutritional services were included as dependent variables.

Many phase 1 key informants discussed transportation as an SES-related barrier to accessing high-quality care. Syed and colleagues found that transportation barriers impacted medication refills and pharmacy adherence. They also found that patients with a lower SES had higher rates of transportation

barriers to ongoing health care access than those with a higher SES (Syed, Gerber, & Sharp, 2013). Several phase 1 key informants also recommended the use of telehealth as mechanism to offset SES-related barriers to accessing high-quality care. As a result, transportation and telehealth benefits were included as dependent variables in phase 2.

Section 9.2 Methods

We conducted a retrospective database analysis of supplemental benefits offered by MA plans to investigate the impact of individual and community-level SES on the probability that plans offered specific supplemental benefits and required a premium. We analyzed data and developed models to predict the impact of individual and community level SES, controlling for important policy-related variables, on the probability that a given plan offered a given supplemental benefit and required a premium.

Section 9.2.1 Data Analysis Process

This analysis required the integration of data from publicly available files published by the Center for Medicare & Medicaid Services (CMS) and posted to their Web site (*Update of the HHS Poverty Guidelines, 2014; 2014 Low Income Subsidy Enrollment by Plan*, 2014; *2014 MA Landscape Source Files*, 2014; *2014 MMP Landscape Source Files*, 2014; *2014 SNP Landscape Source Files*, 2014; *2015 Low Income Subsidy Enrollment by Plan*, 2015; *2015 MA Landscape Source Files*, 2015; *2015 MMP Landscape Source Files*, 2015; *2015 SNP Landscape Source Files*, 2015; Blum et al., 2014; *Monthly Enrollment by CPSC - December 2015*, 2015; *Monthly Enrollment by CSPC - December 2014*, 2014; *Monthly Enrollment by Plan - December 2014*, 2014; *Monthly Enrollment by Plan - December 2015*, 2015; *PBP Benefits 2014*, 2014; *PBP Benefits 2015*, 2015). Organizations offering MA plans are required to file reports that detail the benefits and geographic locations in which plans are offered. These reports are compiled by CMS, and available for public use.

Section 9.2.2 Dependent Variables

As discussed above, based on a scan of the literature and the feedback of the committee and the key informants, we selected the following dependent variables: the presence of a premium and the presence of the following supplemental or enhanced benefits (*Medicare Managed Care Manual Chapter 4 - Benefits and Beneficiary Protections*, 2016): Transportation, Meals, Nutrition, EDM, and Telemonitoring. Only MA plans offering Medicare Parts A, B and D (MA-PD plans) were included in the analysis.

MA plans may provide transportation as a supplemental benefit to obtain nonemergent, covered part A and part B services if they are used exclusively for health care needs (*Medicare Managed Care Manual Chapter 4 - Benefits and Beneficiary Protections*, 2016). MA plans can offer meals as a supplemental benefit only if they are provided temporarily and under the order of a physician or other nonphysician practitioner as a part of medical treatment of an illness. They may not be provided solely to address social issues. Meals may be covered as a supplemental benefit under two circumstances: immediately following surgery or an inpatient hospital stay; or as a part of a supervised lifestyle modification program for a chronic condition, including, but not limited to, cardiovascular disorders, COPD, or diabetes (*Medicare Managed Care Manual Chapter 4 - Benefits and Beneficiary Protections*, 2016). A nutritional/dietary benefit can be provided as a supplemental benefit up to the number of visits or time limitations established by the MA plan if those services are provided by licensed practitioners operating within the scope of their license (*Medicare Managed Care Manual Chapter 4 - Benefits and Beneficiary Protections*, 2016).

EDM may be offered as a supplemental benefit only by a non-SNP plan and must be delivered by clinical staff with specialized knowledge of the enrollee's specific disease or condition. EDM must be targeted to groups of enrollees based on a diagnosis of, or risk for, a specific disease condition and must fall into one of three categories: Assignment of individuals with the targeted conditions to qualified case managers with specialized knowledge about the disease(s) for the delivery of case management and monitoring services designed to improve patient education, activation and adherence; educational

activities provided by certified or licensed professionals designed to help enrollees with specific diseases to develop knowledge and self-care skills, strategies and tactics to manage their disease; and routine monitoring of measures, signs and symptoms of specific diseases and conditions. (*Medicare Managed Care Manual Chapter 4 - Benefits and Beneficiary Protections*, 2016).

Finally, MA plans are authorized to offer as a supplemental benefit in-home equipment and telecommunication technology to monitor enrollees with specific health conditions as long as the benefit does not duplicate services provided in Medicare A, B, and D. In addition, in-home equipment or telecommunications technology must supplement, but not replace, face-to-face physician visits. Other specific restrictions apply to each of these benefits (*Medicare Managed Care Manual Chapter 4 - Benefits and Beneficiary Protections*, 2016). The data sources for each variable and the links to those sources are included in Appendix I.

Section 9.2.3 Independent and Control Variables

We controlled for a series of policy-relevant independent variables: contract star score, county star bonus caps, weighted average plan membership, and weighted average low-income subsidy eligible plan membership.

Section 9.2.4 Special Needs Plans (SNP)

General information for SNP and MA plans are provided in separate Landscape Source Files on the CMS Web site. If a plan was located in an SNP file, a SNP indicator variable was set to 1 (yes). If the plan was located in an MA file, the SNP indicator was set to 0 (no). The SNP and MA landscape data sets for each year were merged with the benefits data set by contract and plan ID. To be included, the research required that the plan ID be present in both the benefits data set and one of the landscape source files.

Section 9.2.5 Plan Size

Enrollment by plan data was provided on the CMS Web site by monthly enrollment. For each year, all 12-month data sets were merged by contract and plan ID. Annual plan enrollment was estimated as the average of the 12-month enrollments. An average of monthly enrollment was used rather that

enrollment in any single month in order to account for enrollment spikes. Utilizing average monthly enrollment also allowed for the inclusion of more plan offerings in the analysis.

These data sets also included a variable indicating whether the plan offered part D benefits. Plans that did not offer part D benefits were excluded. Using only those plans that included part D benefits, annual plan enrollment estimates were then merged into the data, the included plan sizes were then ranked into quintiles, and indicator variables were created. Cutoffs for plan enrollment quintiles are presented in Table 8.

Section 9.2.6 Part D Low-Income Subsidy Eligible Enrollment

Part D (MA-PD) and low-income subsidy part D (LIS MA-PD) annual enrollment by plan is made available on the CMS Web site. A list of the data files used and links to those data files are contained in Appendix I. The percentage of plan members eligible for a LIS was calculated as LIS MA-PD enrollment divided by MA-PD enrollment, multiplied by 100. Certain data are not posted by CMS due to small (ten or fewer members) plan size. Therefore, missing LIS MA-PD enrollment values were set to zero but missing MA-PD enrollment values were as left as missing. That is, if a plan had LIS MA-PD enrollment of ten or fewer and MAPD enrollment of 11 or more then the LIS MA-PD percent was set to zero. However, if a plan did not have at least 11 people MA-PD enrolled for that year then no LIS percentage was estimated.

Section 9.2.7 Star Rating

Given the impact of MA stars performance on available plan revenue and, therefore, funds available to spend on supplemental benefits, the analysis controlled for star score. In addition, because the ACA capped the percentage stars bonus that plans operating in certain counties may earn at 0%, 3.5%, and 5%, the methodology further controlled for the impact of county caps. Finally, to account for differential plan sizes, plan membership was controlled for both annually and on a monthly basis.

Star scores are determined at the level of the contract between the sponsoring organization and CMS. However, under that contract, the sponsoring organization may offer any number of individual plan benefit packages (PBPs). In addition, a single plan benefit package may be “segmented” (CMS, 2014b).

A segment is, in essence, a plan within a plan. Plan sponsors use segmentation to vary benefits, premiums and cost sharing within a single PBP and service area. CMS requires that those variations be uniform within each segment (*Medicare Managed Care Manual Chapter 4 - Benefits and Beneficiary Protections*, 2016). Generally, the purpose of segmentation is to offer distinct plan features within the same contract and plan benefit package. This provides plan sponsors with flexibility to design unique benefit or cost sharing packages that may be appealing in the marketplace without having to create a completely distinct plan benefit package.

The benefits data were provided by CMS at the contract, plan, and segment levels. These data were matched to the landscape source files at the contract, plan, segment, state, and county levels. There were not multiple segments of a plan within any one county, and with the exception of the constructed premium benefit, benefits did not vary by segment within plan. Therefore, the benefit analysis was done at the PBP level and the premium benefit for plans composed of segments with differing premium benefits were set to missing.

Section 9.2.8 ADI and County Star Bonus Caps

Consistent with the work of Kind and colleagues (Kind et al., 2014), we used the Area Deprivation Index (ADI) (Health Innovation Program, 2014) as a proxy for the socioeconomic status of the residents of the counties in which each plan offering was made available. While ADI is calculated at multiple levels, because MA plans are filed at the county level, this study used county-level ADI. ADI is expressed as a score. Higher ADI values represent higher levels of deprivation. (For more information regarding ADI, see Appendix H). ADI scores were divided by quintiles with the reference for county measurement set at the median and regression done relative to year zero at median ADI. The cutoff points for the ADI quintiles are contained in Table 7.

The University of Wisconsin's ADI calculations are based on 2000 census data and, as a result, they did not vary by year. In addition, rate caps of 0%, 3.5%, and 5% were established by CMS based on statutory requirements and did not vary by year. County-level variables were merged by state and county ID into the Landscape source files. As star rating, ADI and rate caps were weighted by county plan

enrollment up to the plan level, the county ADI indices, weighted by county plan enrollment, produced an average ADI index that could be interpreted as the average ADI index of plan enrollees. The average ADIs were then ranked into quintiles and indicator variables were created. The quintiles for the ADI averages are also shown in Table 7.. The weighted average ADI was ranked into quintiles and indicator variables were created with the third quintiles used as the reference group.

Table 7. ADI by quintile

ADI quintile	N	Mean	SD	Minimum	Maximum	Range
1	643	71.230409	25.6297943	-216.702	90.135	306.837
2	644	95.8273742	2.8757572	90.18	100.242	10.062
3	645	103.8292884	2.0519578	100.251	107.28	7.029
4	643	110.4528849	1.8668322	107.298	113.823	6.525
5	644	118.625646	3.6726658	113.832	136.233	22.401

Section 9.2.9 County Plan Enrollment Weights

Characteristics of each plan coverage area were determined by weighting county-level attributes by plan enrollment. Similar to total plan enrollment, county plan enrollment was given by month and were averaged to produce annual estimates. County weights for each plan were constructed by dividing the annual county enrollment estimate by the sum of all the annual county enrollment estimates. These weights were used to produce weighted averages for star ratings, county bonus cap (0%, 3.5%, and 5%) indicators and ADI. The cutoff for ADI quintiles of individual counties as well as for the quintiles of the weighted averages are in Tables 7 and 8, respectively.

Table 8. Plan enrollment by quintile

Rank for variable	N	Mean	SD	Minimum	Maximum	Range
1	868	177.7062212	119.4690584	11	417	406
2	870	825.8528736	259.5676568	419	1,310	891
3	870	2023.79	507.7035288	1,311	3,040	1,729
4	869	4991.8	1,311.46	3,043	7,719	4,676
5	869	21,016.38	17,416.85	7,731	165,843	158,112

Section 9.3 Analysis

The statistical analysis was conducted under my direction by two researchers with significant experience conducting econometric analysis, including multivariate statistical analysis. The senior researcher brought to the project substantial experience in econometric research related to health insurance, including MA. We developed six probability models to test the hypothesis that lower SES and higher ADI increases the probability that plans offer the supplemental benefits/plan features included as dependent variables.

The general form for all six models was

The Probability of a given benefit = SES in a county over time + T (2014 (base) + T 2015 (intervention) + the interaction of SES (weighted average ADI score) and time + controls (contract star score, contract county % LIS).

These models estimate each of six dependent variables' impact on the probability the plan includes a given supplemental benefit or requirement of a premium. To obtain estimates for these impacts, we employed generalized linear models (GLMs) with a binary distribution and logit link function. GLM is an overall approach to regression modeling that is adaptable to many different types of dependent variables (e.g., continuous, binary, and categorical) simply by changing the distribution and link function parameters. The advantage of GLM is its flexibility to accommodate many types of dependent variables, its relative ease of use, its ability to accommodate hierarchical data and repeated

measures, and its ability to use various post-estimation procedures to contextualize the impact of the independent variables.

The result of the modeling is the estimation of coefficients for each independent variable, or term in the model. These coefficients are expressed on the log scale, as the result of the use of the logit link function in GLM. These coefficients are easily converted to odds ratios (ORs), which offer a more approachable interpretation of the impact of a given independent variable on the probability a plan offers a benefit or premium. A statistically significant OR ($p>0.05$) greater than one is accretive to the probability, and less than one is referred to as protective, or decreases the probability of the inclusion of the dependent variable. A similar result could be obtained by using logistic regression, but the GLM approach allows more flexibility to accommodate the challenges presented by these data, and also offers more post-estimation options.

These data pose two primary econometric challenges: first, the nesting of plans within geography and second, contracts, and repeated observations of plans across time and geography. To accommodate these issues, specifically the violation of independence assumption, generalized estimating equations (GEEs) were used to estimate empirical standard errors to adjust for the correlation in plan measured repeatedly from 2014 to 2015.

All continuous covariates were centered and third quintiles were chosen as the reference groups due to their inclusion of the mean. Because the covariates were centered, the exponent of the intercept represents the baseline odds of a plan's inclusion of a benefit in the reference groups and at the mean of all other the variables. The exponent of the coefficients for variables not involved in any interactions can be interpreted as ORs. Odds ratios for all pairwise combinations of categorical variable were found by taking the exponent of the differences of linear combinations of the regression coefficients of the categorical variables.

ORs are notoriously difficult to interpret, as they are relative measures of contribution/detraction from probabilities, based on the underlying the probability of an event. In addition, odds ratios are relative measures which have been criticized for exaggerating individualized effects (Stegenga, 2015). To

contextualize OR results and provide an interpretation on the probability scale, we computed a variety of post-estimation results to deliver estimates on the probability scale, specifically the change in the underlying probability associated with an independent variable. All models were fit using the "proc genmod" function in SAS (v.9.4) (Cary, NC). The model expresses the resultant coefficients for each of the regression term (independent variables) as an odds ratios, which can be difficult to interpret (Katz, 2006). To aid in the interpretation of these results, we performed two post-estimation analyses to assess the policy relevance of the independent variables, calcuating risk differences (RD) for the main effect of SES over the two observation years, and marginal effects (ME) for the balance of the control variables. Both the RD and the ME are denomonated in probability terms, which allows a direct interpretation as to the change in the probability of a supplemental benefit or premium associated with a change in that specific variable, controling for all others in the model.

For continuous and dichotomous variables, we computed Marginal Effects (ME) for each independent variable, representing the change in the probability of a given benefit, associated with a one-unit change in the independent variable. For categorical variables, these odds ratios were converted to risk differences and risk ratios. These estimates are the contrasts between each group and the referent, on the probability scale (e.g., a 2% increase in the probability of a given benefit being included between a given quintile and the mean for a given variable).

Section 9.4 Results

Organized in this manner, 34,970 unique plan offerings, by county, were observed in 2014 and 33,510 in 2015. Among them, in 2014, 8,041 SNP plan offerings were observed and in 2015, 8,766 SNP plan offerings were observed. These observations represent repeated observations of plans in each county in which they are offered. Counts of unique plans and repeated observations across geography are detailed in Table 9. Appendix K provides the descriptive statistics of the analytical sample by benefit and by year in a table.

Table 9. Observations by plan type and monthly average enrollment

	2014	2015	Total	Variables included
Plan offerings, all plans	34,970	33,510	68,480	Contract plan segment state county
Plan offerings, SNP only	8,041	8,766	16,807	Contract plan segment state county
Monthly average enrollment for all plan offerings	2,531,764	2,386,388	4,918,152	Contract plan state county (monthly averaged)

We then examined the proportion of plan offerings, which included one of the dependent variables. The units of measurement were all MA-PD plans (all plans), SNP MA-PD plans (SNP plans), MA-PD plans that are not SNP plans (non-SNP plans), all MA-PD Plans weighted by county-level enrollment, all MA-PD plans weighted by the proportion of enrollees who are eligible for a low-income subsidy under Medicare part D (all plans, weighted by LIS MA-PD annual enrollment), and all MA-PD plans weighted by both county-level enrollment and LIS MA-PD enrollment. Those results are included in Tables 10 to 15.

In summary, the proportion of plan offerings that included telemonitoring or required a premium remained virtually stable (a 1% or less change) from 2014 to 2015. The proportion of non-SNP plan offerings which included an EDM benefit was also relatively stable (1% increase) but SNP plans were precluded from offering the benefit in 2015, resulting in a year-over-year decrease of 8% of plan offerings including EDM. The proportion of plan offerings which included a transportation benefit remained stable among non-SNP plans (19%) but decreased among SNP plans by 3%. The proportion of plan offerings that included a meals benefit decreased among SNP plans but increased among non-SNP plans (3% each) from 2014 to 2015. The number that included a nutrition benefit dropped substantially (48% to 18% among SNP plans and 15% to 11% among non-SNP plans).

Table 10. Proportion of plan offerings including a transportation benefit

	Transportation benefit			
	No		Yes	
Unit	2014	2015	2014	2015
SNP plans	148 (26%)	159 (29%)	414 (74%)	380 (71%)
Non-SNP plans	1,360 (81%)	1,332(81%)	314(19%)	308 (19%)
All plans	1,508 (67%)	1,491(68%)	728(33%)	688 (32%)
All plans, weighted by number of counties offered	24,827 (74%)	25,115 (74%)	8,898 (26%)	8,625 (26%)
All plans, weighted by LIS MAPD annual enrollment	1,635,032 (53%)	1,689,547 (51%)	1,429,990 (47%)	1,631,278 (49%)
All plans, weighted by MAPD annual enrollment	8,749,120 (72%)	9,090,117 (71%)	3,392,751 (28%)	3,768,138 (29%)
All plans, weighted by LIS, further weighted average monthly enrollment	8,824,794 (72%)	9,136,260 (71%)	3,469,366 (28%)	3,804,127 (29%)

Table 11. Proportion of plan offerings requiring the payment of a premium

	Presence or absence of a premium			
	No (a premium was not charged)		Yes (a premium was charged)	
Unit	2014	2015	2014	2015
SNP plans	532 (95%)	514 (95%)	30 (5%)	25 (5%)
Non-SNP plans	775 (46%)	764 (47%)	893 (54%)	865 (53%)
All plans	1,307 (59%)	1,278 (59%)	923 (41%)	890 (41%)
All plans, weighted by number of counties offered	15,963 (47%)	15,585 (46%)	17,655 (53%)	17,940 (54%)
All plans, weighted by LIS MAPD annual enrollment	2,518,628 (83%)	2,647,674 (81%)	533,100 (17%)	630,957 (19%)
All plans, weighted by MAPD annual enrollment	7,885,193 (65%)	7,937,171 (63%)	4,167,347 (35%)	4,690,231 (37%)
All plans, weighted by LIS, further weighted average monthly enrollment	8,029,487 (66%)	8,003,303 (63%)	4,175,053 (34%)	4,704,455 (37%)

Table 12. Proportion of plan offerings including a telemonitoring benefit

	Telemonitoring benefit			
	No		Yes	
Unit	2014	2015	2014	2015
SNP plans	418 (90%)	386 (89%)	47 (10%)	47 (11%)
Non-SNP plans	1,435 (90%)	1,399 (88%)	151 (10%)	185 (12%)
All plans	1,853 (90%)	1,785 (88%)	198 (10%)	232 (12%)
All plans, weighted by number of counties offered	29,416 (95%)	28,971 (93%)	1,649 (5%)	2,297 (7%)
All plans, weighted by LIS MAPD annual enrollment	2,669,798 (94%)	2,855,617 (94%)	176,620 (6%)	188,364 (6%)
All plans, weighted by MAPD annual enrollment	10,938,924 (94%)	11,672,598 (94%)	719,610 (6%)	798,427 (6%)
All plans, weighted by LIS, further weighted average monthly enrollment	11,073,068 (94%)	11,746,111 (94%)	727,151 (6%)	802,526 (6%)

Table 13. Proportion of plan offerings that include a meals benefit

	Meal benefit			
	No		Yes	
Unit	2014	2015	2014	2015
SNP plans	378 (67%)	376 (70%)	184 (33%)	163 (30%)
Non-SNP plans	1,392 (83%)	1,273 (78%)	282 (17%)	367 (22%)
All plans	1,770 (79%)	1,649 (76%)	466 (21%)	530 (24%)
All plans, weighted by number of counties offered	27,087 (80%)	26,002 (77%)	6,638 (20%)	7,738 (23%)
All plans, weighted by LIS MAPD annual enrollment	2,615,209 (85%)	2,624,377 (79%)	449,813 (15%)	696,448 (21%)
All plans, weighted by MAPD annual enrollment	10,586,601 (87%)	10,282,972 (80%)	1,555,270 (13%)	2,575,283 (20%)
All plans, weighted by LIS, further weighted average monthly enrollment	10,705,169 (87%)	10,343,248 (80%)	1,588,991 (13%)	2,597,139 (20%)

Table 14. Proportion of plan offerings that include a nutritional benefit

	Nutritional benefit			
	No		Yes	
Unit	2014	2015	2014	2015
SNP plans	244 (52%)	357 (82%)	221 (48%)	76 (18%)
Non-SNP plans	1,353 (85%)	1,406 (89%)	233 (15%)	178 (11%)
All plans	1,597 (78%)	1,763 (87%)	454 (22%)	254 (13%)
All plans, weighted by number of counties offered	27,137 (87%)	28,953 (93%)	3,928 (13%)	2,315 (7%)
All plans, weighted by LIS MAPD annual enrollment	2,223,514 (78%)	2,520,138 (83%)	622,904 (22%)	523,843 (17%)
All plans, weighted by MAPD annual enrollment	9,522,498 (82%)	10,600,412 (85%)	2,136,036 (18%)	1,870,613 (15%)
All plans, weighted by LIS, further weighted average monthly enrollment	9,615,970 (81%)	10,664,920 (85%)	2,184,249 (19%)	1,883,717 (15%)

Table 15. Proportion of plan offerings including an EDM benefit

	EDM			
	No		Yes	
Unit	2014	2015	2014	2015
SNP plans	427 (92%)	433 (100%)	38 (8%)	– (–)
Non-SNP plans	1,486 (94%)	1,479 (93%)	100 (6%)	105 (7%)
All plans	1,913 (93%)	1,912 (95%)	138 (7%)	105 (5%)
All plans, weighted by number of counties offered	29,369 (95%)	30,200 (97%)	1,696 (5%)	1,068 (3%)
All plans, weighted by LIS MAPD annual enrollment	2,725,913 (96%)	2,960,768 (97%)	120,505 (4%)	83,213 (3%)
All plans, weighted by MAPD annual enrollment	10,969,232 (94%)	11,831,278 (95%)	689,302 (6%)	639,747 (5%)
All plans, weighted by LIS, further weighted average monthly enrollment	11,108,019 (94%)	11,908,946 (95%)	692,200 (6%)	639,691 (5%)

Section 9.4.1 Multivariate Analyses

The purpose of the multvariate analysis and regression model was two-fold: to test the main hypothesis of the study and to allow for the assessment of policy relevance of the independent variables. Each of the five supplemental benefits and the requirement of a premium were modeled independently following the same general form and included the same main effect for SES and important policy-related control variables. The results of each of the six models are given in Appendix J.

To ensure that the model accurately predicted the underlying data, we tested the model for goodness of fit. We used the Akaike information criterion (AIC) (Bozdogan, 1987) to assess model fit. Those results, included in Table 16, are all within the range of acceptability (Greene, 2007).

> In the context of logistic regression, goodness of fit tests are designed to determine the adequacy or inadequacy of the fitted logistic model in describing the relationship between the outcome variable and the potential risk factors. The purpose of the goodness of fit test is to determine whether the model fits the data, otherwise conclusions may be incorrect or misleading. If the model is adequate, then we may proceed. Otherwise, we need to search for a more suitable model, one that will be more useful in explaining the outcome variable. (Hallett, 1999)

Table 16. Goodness of fit scores

Transportation	Meals	Nutrition	Telemonitoring	EDM	Premium
3,745.71	3,861.27	2,818.75	2,264.44	1,548.25	3,651.76

The hypothesis test was conducted by inspecting the statistical significance ($p < .05$) of the main effect, the coefficient of the interaction term for ADI and year. The results do not support our primary hypothesis. Specifically, county ADI has no statistically significant effect ($p > .05$) on the likelihood of a plan offering any five of the supplemental benefits or the requirement of a premium in either 2014 or 2015.

However, to test our secondary hypothesis that stars related revenue impacted benefit availability, we compared SNP versus non SNP plans. The vast majority of SNP are designed to serve people dually eligible for Medicare and Medicaid (DSNPs) and, as a group, have lower stars performance (Inovalon, 2013; Weiss & Pescatello, 2014). The results of this analysis were generally consistent with our

hypothesis. Specifically, we saw both a negative marginal effect of SNP designation on each benefit available for inclusion in 2015 and statistically significant reductions in the offering of transporation and supplemental nutrition benefits. EDM was eliminated entirely among SNPs as a result of a CMS policy change.

Table 17. Marginal effect of SNP by year

Parameter	Transportation	Meals	Nutrition	Telemonitoring	Premium	EDM
SNP year 2015 (2014 is referent)	-0.0733	-0.0527	-0.1902	-0.0153	-0.0164	n/a

Section 9.4.2 Risk Differences

Risk differences express the absolute difference on a probability scale, that a given benefit or premium is offered/required, between two groups. In this study, we examined the risk difference among all plans of a particular benefit being included in a given plan offering in year 2014 or year 2015 and the risk difference of that same benefit being included in a plan offering in a county in one ADI quintile versus another ADI quintile. These results are included in Table 18. Statistical significance is noted by a series of asterisks as follows: * p=.1; ** p<.05; *** p<.001. So, for example, the top line of Table 18 compares the risk difference between plan offerings in counties in ADI quintile 1 in 2015 as compared to 2014, line 2 compares the risk difference in 2014 between plan offerings in ADI quintile 1 and ADI quintile 2.

Table 18. Risk differences by ADI quintile and year

Test-weighted average ADI quintile	Referent-weighted average ADI quintile	Test year	Referent year	Trans-portation	Premium	Tele-monitoring	Meals	Nutrition	EDM
1	1	2015	2014	-0.037	-0.035	0.006	0.089***	-0.083***	-0.066**
1	2	2014	2014	-0.018	0.058	0.021	-0.118***	-0.096*	0.054*
1	2	2015	2015	-0.027	0.053	-0.029	-0.023	-0.036	0.016
1	3	2014	2014	-0.023	0.071*	-0.017	-0.177***	-0.118**	0.012
1	3	2015	2015	-0.014	0.052	-0.002	-0.124***	-0.016	0
1	4	2014	2014	0.026	0.056	0.025	-0.162***	-0.073	0.056*
1	4	2015	2015	0.03	0.074**	0.028	-0.138***	0.053*	0.018
1	5	2014	2014	-0.056	0.057	0.068**	-0.196***	-0.132**	0.087***
1	5	2015	2015	-0.066	0.027	0.057*	-0.147***	0.042	0.042***
2	2	2015	2014	-0.028	-0.029	0.056**	-0.006	-0.143***	-0.028
2	3	2014	2014	-0.005	0.013	-0.038	-0.059	-0.023	-0.041
2	3	2015	2015	0.013	-0.001	0.027	-0.102**	0.019	-0.016
2	4	2014	2014	0.043	-0.002	0.004	-0.044	0.023	0.002
2	4	2015	2015	0.057	0.021	0.056*	-0.115**	0.089***	0.002
2	5	2014	2014	-0.038	-0.002	0.047*	-0.079*	-0.037	0.033*
2	5	2015	2015	-0.039	-0.026	0.086**	-0.124***	0.078**	0.026**
3	3	2015	2014	-0.046	-0.015	-0.009	0.037	-0.185***	-0.053***
4	3	2014	2014	-0.049	0.015	-0.042	-0.015	-0.045	-0.043
4	3	2015	2015	-0.044	-0.022	-0.029	0.013	-0.07**	-0.019
4	4	2015	2014	-0.042	-0.052	0.004	0.065*	-0.21***	-0.029*
4	5	2014	2014	-0.082	0.001	0.043*	-0.034	-0.059	0.031
4	5	2015	2015	-0.096*	-0.047	0.029	-0.009	-0.011	0.024*
5	3	2014	2014	0.033	0.015	-0.085***	0.019	0.014	-0.074***
5	3	2015	2015	0.051	0.025	-0.059*	0.022	-0.058*	-0.042***
5	5	2015	2014	-0.028	-0.005	0.017	0.039	-0.258***	-0.021**

Highlighting represents statistically significant results.

Section 9.4.3 Risk Differences of Benefit Inclusion Among All MA-PD Plans

Appendix J displays data tables describing the risk differences by studied benefit and the presence or absence of a premium requirement. The extent of the risk differences varied substantially by benefit. For transporation, none of the comparisons was statistically significant at the $p>.05$ level. For telemonitoring and the presence of a premium, a small number of the comparisons were statistically significant. For meals, nutrition and EDM many of the comparisons were statistically significant. However, because EDM was no longer offered by SNP plans in 2015, the statistically significant risk differences between years likely reflect this policy change rather than a change in plan practices.

Looking at the premium payment requirement, the only statistically significant comparison was the risk difference between plan offerings in ADI quintile 1 and ADI quintile 4 counties in 2015. The risk difference between those two quintiles of a premium being required is 7.4% meaning that with a base probability of 41%, plan offerings in quintile 1 were 18% more likely than those in quintile 4 to require the payment of a premium in 2015. Interestingly, the risk difference of a premium requirement in 2015 between ADI quintiles 1 and 5 (the highest and lowest ADI counties) was only 2.7%, while the other three ADI quintile comparisons were in the mid-5% (ranging from 5.2%-5.8%) and none was statistically significant, calling into question any conclusions that might be drawn from the one statistically signficant result.

For telemonitoring statistically significant risk differences were found between ADI quintiles 1 and 5 in 2014, but not in 2015, between ADI quintiles 2 and 5 in 2015 and ADI quintiles 5 and 3 in 2014. In addition between 2014 and 2015, there was a statistically signficant risk difference in ADI quintile 2. Specifically, in 2014, there was a 6.8% risk difference between quintiles 1 and 5. As a result, because the base probability of the benefit being offered in all counties was 10%, plan offerings in ADI quintile 1 counties in 2014 were 68% more likely to include a telemonitoring benefit than in ADI quintile 5 counties. Interestingly, while a risk difference remained in 2015 (5.7%), it was no longer statistically significant.

The presence or absence of a meals benefit appears to tell a different story. Looking at the plan offerings over time, in 2015 in ADI quintile 1 (the least deprived) counties, the probability that a plan offering included a meals benefit was nearly 9% higher than it was in 2014. This is the only ADI quintile in which the year over year results were statistically significant. However, looking at the benefits within years and between ADI quintiles, several differences were statistically significant. In 2014, a plan offering in a quintile 1 ADI county was nearly 12% less likely to offer a meal benefit than a plan offering in a quintile 2 ADI county, nearly 18% less likely to offer a meal benefit than a plan offering in quintile 3 ADI county, nearly 16% less likely to offer a meals benefit than a plan offering in a quintile 4 ADI county and nearly 20% less likely to offer a meals benefit than a plan offering in a quintile 5 county. In 2015, while there was no statically significant risk difference between ADI quintile 1 and 2, a plan offering in a quintile 1 ADI county was more than 12% less likely to offer a meal benefit than a plan offering in a quintile 3 ADI county, nearly 14% less likely than a plan offering in a quintile 4 ADI county and nearly 15% less likely than a plan offering in a quintile 5 ADI county to offer a meals benefit.

The risk differences among plan offerings including a nutrition benefit also varied significantly in many of the comparisons we ran. Examining year over year differences, each ADI quintile plan offerings were significantly less likely to include a nutrition benefit in 2015 than in 2014 (e.g., 8.3% less likely in quintile 1, 14.3% less likely in quintile 2, 18.5% less likely in quintile 3, and 21% less likely in quintile 4 and 25.8% less likely in quintile 5). Within the years, in 2014 plan offerings were 11.8% less likely to offer a nutrition benefit in quintile 1 than quintile 3 and 13.2% less likely to offer a nutrition benefit in quintile 1 than in quintile 5. Meaning, that in 2014, plans in the least deprived communities were more likely to offer a nutrition benefit than those in the most deprived communities. In 2015, in contrast, plans in quartile 2 were 8.9% more likely to offer a nutrition benefit than in quartile 4, 7.8% more likely to offer a nutrition benefit in quartile 2 than in quartile 5 and 7% less likely to offer a nutrition benefit in quartile 4 than in quartile 3.

Looking only at the risk differences within years for EDM as a result of the policy change noted above, lower ADI (less deprived) counties were more likely to have plan offerings which included the

EDM offering than higher ADI counties in both years. In 2014, plan offerings in counties in ADI quintile 1 were 8.7% more likely and plan offerings in counties in ADI quintile 3 were 7.4% more likely to include EDM than plan offerings in counties in ADI quintile 5. In 2015 plan offerings in counties in ADI quintile 1 were 4.2%, plan offerings in counties in ADI quintile 2 were 2.6% and plan offerings in ADI quintile 3 were 4.2% more likely than plan offerings in ADI quintile 5 to offer EDM. The lower differences between the two years are likely related to the fact that SNP plans no longer included EDM.

Section 9.4.4 Risk Differences of Benefit Inclusion between SNP versus Non-SNP Plans

Risk differences by benefit and premium requirement were also compared between SNP and non-SNP MA plans over the two analysis years (2014 and 2015). The analysis could not be conducted for EDM because, beginning in 2015, EDM was no longer available to be offered in SNP plans.

In examining the risk differences in the availability of transportation benefits between SNP and non-SNP plans, 3 of the 4 comparisons (all but the year over year comparison of non-SNP plans) were statistically significant. SNP plans were 54% more likely in 2014 and 45% more likely in 2015 than non-SNP plans to offer a transportation benefit. However, even SNP plans were 8% less likely in 2015 to offer a transportation benefit than they were in 2014.

In examining the availability of meals benefits, again, 3 of the 4 comparisons were statistically significant (all but the year over year comparisons among SNP plans). In 2014 the risk difference of a plan offering including a meal benefit was 17% greater in a SNP plan than in a non-SNP plan. That difference declined to 13% but remained statistically significant in 2015. However, even non-SNP plans were more likely to include a meals benefit in 2015 than in 2014. Specifically, non-SNP plans were 6.5% more likely in 2015 than in 2014 to include a meals benefit.

Both SNP and non-SNP plans were less likely in 2015 to offer a nutrition benefit in 2015 than they were in 2014 (SNPs were 40.5% less likely and non-SNPs were 3.1% less likely). However, even with this substantial reduction in the likelihood of inclusion, SNP plans were 44.7% more likely to offer a nutrition benefit than non-SNP plans in 2014 and 7.4% more likely than non-SNP plans to offer the benefit in 2015.

The availability of telemonitoring differed much less significantly between SNP and non-SNP plans. The difference was statistically significant in 2014 (6.9%), but not in 2015, and non-SNP plans were 1.8% more likely to include telemonitoring in 2015 than in 2014. However, given the small size of the risk difference and the large size of the data set, while statistically significant, this year-over-year difference is not likely meaningful from a policy perspective.

Not surprisingly, because the majority of SNP plans are DSNP plans and pursuant to Section 1852(a)(7) of the Act and 43 CFR Section 422.504(g)(1) DSNPs are restricted from charging a premium SNP plans were significantly less likely to charge a premium than non-SNP plans in both years (29.4% in 2014 and 28.2% in 2015). Of note, however, the risk difference of a plan offering including a premium between 2014 and 2015 was not significant either among SNP plans or non-SNP plans meaning that despite the fact that many plans that lost quality bonus eligibility 2015, plan offerings were not significantly more or less likely to charge a premium.

Section 9.4.5 Marginal Effects

The marginal effect of a dependent variable measures how the predicted probability (e.g., probability that a plan offers a transportation benefit) changes for each one-unit change in the underlying independent variable. For binary independent variables, the one-unit change is the contrast between the referent and alternate category. For example, in the case of the SNP indicator variable, the contrast between SNP plan and non-SNP plans. For categorical variables, such as quintiles of ADI and plan enrollment, the marginal effect describes the difference in the predicted probabilities associated with a one quintile change from the referent quintile, in this case quintile 3. The median quintile was chosen as the referent category because it contains the mean, essentially the proportion for a given binary independent variable. Table 17 provides estimates of the marginal effects of each independent variable on each dependent variable. Each row shows the change in the probability of having the given benefit or premium associated with a one-unit increase in the independent variable.

The effect of ADI is less significant although the marginal effect of residence in the most deprived counties (ADI quintile 5) is positive for transportation, meals and nutrition. The marginal effect

on the presence of a premium by increasing county-level ADI is negligible. The marginal effect of the addition of 1% of LIS eligible membership is also negligible. While negligible, marginal effect of the addition of 1% of LIS eligible membership is positive for transportation and meals but negative for nutrition, telemonitoring, EDM, and presence of a premium.

More substantial but directionally similar results were seen for the marginal effect of SNP designation. In 2014, the SNP designation more than doubled the probability of a plan offering including transportation and nutrition, and reduced the likelihood of a premium being applied by nearly 79%. For example, when looking at the probability of having transportation benefit in any plan benefit package, the baseline probability of the benefit being included is approximately 20%, while the marginal effect of being a SNP plan is approximately 39% (raising the probability of having a transportation benefit in a SNP plan to 59%). Similarly, the baseline probability of a plan offering a meals benefit was nearly 22%, but the marginal effect of the SNP designation (nearly 16%) raised the probability that a SNP plan offering in 2014 offered a meals benefit from 22% to 38%. In 2015, the marginal effect of the SNP designation declined for every benefit, except transportation. So, for example, the probability of a SNP plan offering including meals in 2015 dropped from 38% to 33%.

As discussed, the marginal effect of SNP designation is not relevant for EDM because SNP plans were precluded from offering EDM in 2015. It is also likely not relevant a premium requirement is a questionable metric because, pursuant to Section 1852(a)(7) of the Act and 43 CFR Section 422.504(g)(1), DSNPs cannot impose cost sharing requirements on specified dual eligible individuals (FBDEs, QMBs or any other population designated by the State) that would exceed the amounts permitted under the State Medicaid plan if the individual were not enrolled in the DSNP. As a result, SNP plans requiring the payment of a premium are likely limited to Institutional Special Needs Plan (ISNP) or Chronic Special Needs Plan (CSNP) plans, which, in 2015, represented only 14% of SNP plans.

Table 19. Estimates of marginal effects

Parameter	Transpor-tation	Meals	Nutrition	Telemon-itoring	Premium	EDM
Baseline probability	0.2012	0.2171	0.1475	0.1357	0.3796	0.1019
Marginal effect of plan being a SNP	0.3923	0.1575	0.2734	0.0672	-0.2993	0.0502
Marginal effect of plan presence in weighted average ADI quintile 1	-0.0147	-0.1881	-0.072	-0.0131	0.0697	0.007
Marginal effect of plan presence in weighted average ADI quintile 2	-0.0034	-0.0505	-0.0125	-0.0321	0.0142	-0.03
Marginal effect of plan presence in weighted average ADI quintile 4	-0.0315	-0.012	-0.0253	-0.0365	0.0165	-0.0318
Marginal effect of plan presence in weighted average ADI quintile 5	0.021	0.0152	0.0074	-0.0922	0.0158	-0.0717
Marginal effect of percent LIS eligible membership	0.0003	0.0005	-0.0005	-0.0015	-0.0079	-0.0011
Year 2015 (2014 is referent)	0.0077	0.0542	-0.03	0.0008	-0.0114	-0.0482
Marginal effect of county-weighted average star score	0.034	0.1124	0.1436	-0.0094	0.0507	0.0069
Marginal effect of stars incentive payments capped at 0%	-0.0025	0.0005	-0.0022	-0.0005	0.0041	0.0001
Marginal effect of stars incentive payments capped at 3.5%	-0.001	0.0008	0.0029	-0.0012	0.001	0.0002
Marginal effect of stars incentive payments capped at the full 5%	-0.0004	-0.001	-0.0021	0.0006	0.0009	-0.0001
Marginal effect of plan offering in quintile 1 of total plan size	0.0079	0.0345	0.0024	-0.058	-0.0228	-0.0589
Marginal effect of plan offering in quintile 2 of total plan size	0.0133	0.03	0.018	0.0037	0.0216	-0.0281
Marginal effect of plan offering in quintile 4 of total plan size	-0.048	-0.0179	-0.0458	-0.0398	-0.0084	-0.0232
Marginal effect of plan offering in quintile 5 of total plan size	0.0138	-0.0851	-0.0179	-0.0787	-0.1223	-0.0194
SNP Year 2015 (2014 is referent)	-0.0733	-0.0527	-0.1902	-0.0153	-0.0164	.
Marginal effect of percent LIS eligible membership 2015 (2014 is referent)	0.0006	-0.0004	0.0002	0	-0.0017	-0.0022

Section 9.5 Discussion

Section 9.5.1 Risk Differences Related to Community-Level Deprivation

In studying risk differences between ADI quintiles in 2014 and 2015 and within ADI quintiles between years, overall, there were virtually no statistically significant risk differences in inclusion of transportation benefits or the requirement that beneficiaries pay a premium to participate in the plan. These comparisons yielded inconsistent risk differences for the inclusion of a telemonitoring benefit. Additionally, while county-level ADI yielded statistically significant risk differences for nutrition, EDM and meals benefits, only meals benefits followed our original assumption that they were more likely to be offered in high deprivation counties than in low deprivation counties. In fact, plan offerings including a nutrition and EDM benefits performed in the opposite manner, with plan offerings in the counties with the lowest levels of deprivation more likely to offer nutrition and EDM benefits than plan offerings in counties with the highest level of deprivation. Finally, risk differences tended to narrow between 2014 and 2015 in all ADI quintiles for all benefits, except telemonitoring and meals.

There are a wide array of possible reasons for these results. The year-over-year narrowing of risk differences for all benefits, except telemonitoring and meals, could reflect resource constraints on plans that occurred as the full effect of the ACA-related cuts to MA payments and the end of the quality bonus demonstration went into effect. However, it is also possible that because we examined a limited subset of benefits, that resources that had been devoted to the studied benefits were re-allocated to other benefits that either were viewed by plans as more attractive to potential beneficiaries or more likely to achieve other benefits. Examples of alternative investments might include lowering beneficiary out-of-pocket costs, improvements in care management techniques, acquisition or development of predictive analytic capabilities to identify high-need beneficiaries and payments to recruit, retain or incentivize high performing providers to participate in MA plan networks.

The lack of statistically significant risk differences for premiums and transportation could reflect stability in the marketplace or could reflect uniformity of plan design regardless of county level of deprivation. That telemonitoring and nutrition benefit inclusion did not align with our original

assumptions could reflect an effort by plans to increase enrollment in more affluent communities; differential consumer behavior by level of deprivation (consumers in more deprived neighborhoods placing a higher value on other benefits including meals); or a difference in available plan revenue in low versus high deprivation counties.

With respect to EDM, the year-over-year reduction in the inclusion of the EDM benefit was likely the result of limitations placed on the inclusion of EDM by SNP plans. Because 85% of SNP plans are dual eligible (DSNP) plans it is likely that the differences reflected by ADI quintile reflect differences in the number of dual eligible beneficiaries in the less deprived counties.

Section 9.5.2 Marginal Effects of Other Policy-Relevant Independent and Control Variables

All dually eligible beneficiaries are eligible for a LIS. As a result, the percentage of LIS eligible members in a plan represents both dual eligibles and low SES Medicare beneficiaries who are not eligible for Medicaid. The marginal effect of the addition of 1% of LIS eligible membership was positive for transportation and meals but negative for nutrition, telemonitoring, EDM, and presence of a premium. The negative marginal effect of the addition of 1% of LIS eligible membership for EDM is likely caused by the fact that, after 2015, EDM was not available to be offered in SNP plans. The negative marginal effect of the addition of 1% of LIS-eligible membership on a premium payment requirement is likely due to a combination of factors. First, DSNP plans face restrictions on their ability to impose premiums. Second, DSNPs are by far the dominant type of special needs plans. Finally, a relatively low proportion of LIS-eligible beneficiaries participate in plans that require the payment of a premium. While 41% of all plans in both years charged a premium, weighted by LIS eligible annual enrollment, only 17% of plans in 2014 and 19% of plans in 2015 charged a premium. This makes good sense as people who are LIS eligible have little income to invest in an MA plan.

It is interesting to note that the marginal effect of a county being subject to a stars revenue cap is nominal for all dependent variables and is consistently nominal whether the county is capped at 0%, 3.5% or the full 5% possible star-related incremental revenue. From a policy standpoint, the nominal effect of these caps raises questions regarding how meaningful the stars bonus revenue is in terms of the benefits

plan sponsors offer to consumers or whether stars bonus revenue is used for purposes other than benefits, such as quality improvement, care management, marketing or plan profits. The durability of these findings on additional supplemental benefits and out-of-pocket costs warrants further research.

Section 9.5.3 Overall Impact of SNP Designation

Because the results were either inconsistent or contrary to our original hypothesis for all benefits other than meals, we ran a post-hoc analysis of the impact of SNP designation. What we found, in short, is that SNP matters. In 2015, 210 of the 243 SNP plans offered nationwide (86%) were DSNPs ("Medicare Advantage: Special Needs Plans (SNPs), by SNP Type," 2015). As discussed, DSNPs are available only to individuals who are both Medicare and Medicaid eligible. To be Medicaid eligible, a beneficiary must be low SES. As a result, differences between SNP and non-SNP plans reflect differences between plans designed for low-income beneficiaries and those designed either for higher income groups or without respect to the income of the enrollee population. These results make clear the importance of the SNP designation on the availability of plan offerings which include benefits identified by key informants in phase 1 as likely to break down SES-related barriers to high-quality performance. Removing EDM from this analysis because of the policy change which prohibited plans from offering EDM beginning in 2015, risk differences between SNP and non-SNP plans were significant for all dependent variables, except telemonitoring in 2015. The marginal effect of SNP designation was substantial for all of the benefits in both years, although it reduced for all benefits other than transportation in 2015. The Medicare Access and CHIP Reauthorization Act of 2015 ("Medicare Access and CHIP Reauthorization Act of 2015," 2015) (MACRA) migrated the traditional Medicare program to a value based payment methodology for physicians and extended the SNP program through December 31, 2018 (*Special Needs Plans*, 2016). As Congress begins considering the further extension or permanent reauthorization of the SNP program, further research into the role that SNPs play in offering benefits identified by key informants as associated with reducing SES-related factors to high-quality care should be considered.

Section 9.6 Summary

This study aimed to analyze what impact, if any, the post-ACA MA stars methodology had on the products and services offered by Medicare Advantage plans serving socially and economically vulnerable Medicare beneficiaries. In seeking to answer that question we examined the presence or absence of a series of supplemental and enhanced benefits in MA-PD plan offerings during 2014 and 2015, which represent, respectively, the last year of the quality bonus demonstration program and the first year that the stars bonus methodology was fully in effect. We tested the hypothesis that the larger the proportion of low-income beneficiaries who participated in an MA plan offering and the greater the level of deprivation of the county in which the plan was offered would have a positive effect on the probability that a plan offering included certain supplemental benefits designed to offset SES-related barriers to high-quality care identified by phase 1 key informants and a negative effect on the probability that a plan offering included a premium payment requirement.

The analysis examined the proportion of plans offerings that included transportation, meals, nutrition, EDM, telemonitoring, and a premium payment requirement as well as the risk differences and marginal effects of the proportion of low-income members participating in the plan and the relative deprivation in the county in which the plan was offered on the presence of these benefits. We controlled for a series of policy-relevant independent variables: contract star score, county star bonus caps, weighted average plan membership, and weighted average low-income subsidy eligible plan membership.

Our results found that among all MA plans, county-level deprivation (ADI) was significant both within and between years for the inclusion of a meals benefit. Risk differences were significant for the inclusion of a nutrition benefit between years but were not consistently significant between county ADI quintiles. Examining the EDM benefit, we found statistically significant differences by year in low, medium, and high ADI quintiles (quintiles 1, 3, and 5), but not in the intervening quintiles (2 and 4). Risk differences for the inclusion of an EDM benefit were consistently statistically significant in comparisons of high versus low ADI quintiles (quintiles 1, 2, and 3 when compared individually to quintile 5) in both

years. We found the marginal effect of the addition of 1% of low-income subsidy (LIS) eligible membership to be positive for transportation and meals but negative for all other dependent variables.

We then conducted a post-hoc analysis to determine the impact, if any, of plan SNP designation on the presence or absence of the dependent variables. In examining the risk differences between SNP and non-SNP plans we found consistent, substantial and statistically significant differences for transportation, meals and nutrition. These differences appear to indicate that SNP plans, the vast majority of which are designed to serve individuals who are dually eligible for Medicare and Medicaid, are including supplemental benefits aligned with breaking down SES-related barriers to quality care identified by key informants in phase 1. However, while SNP plans were significantly more likely to include transportation and nutrition than non-SNP plans in both years studied, the risk differences of inclusion of those benefits for SNP plans declined significantly over time. Specifically, SNP plans were 8% less likely to offer a transportation benefit and 40.5% less likely to offer a nutrition benefit in 2015 than they were in 2014.

It is difficult to draw hard conclusions from these findings. While it is clear that SNP matters in terms of the inclusion of the studied benefits and that the differential continued but narrowed in 2015, it is unclear if the declines in the proportion of SNP plans offering all of the studied benefits other than telemonitoring (premium inclusion was stable) were the result of some SNP plans questioning the value of the benefits or the attractiveness of the benefits for marketing purposes or whether the reductions were merely the result of a reduction in available revenue.

The findings that the marginal effects of county-level ADI, stars bonus caps, and LIS eligible enrollment were nominal are surprising and warrant further research. In addition, the fact that the inclusion of a meals benefit in plan offerings is the only dependent variable that produced results consistent with our hypothesis raises a number of questions about the relationship between county-level ADI and plan benefit design. It is possible that the factors plan sponsors consider in developing plan benefit packages are less related to member-level deprivation than other plan features such as care management model, engagement of community based organizations, network design and provider-plan

collaboration and engagement. It is also possible that plans are not designing products at a county level of refinement. Given the limited number of dependent variables and the short time period of the study (2014 and 2015), further research examining the inclusion or exclusion of these benefits over future years, the inclusion of other beneficiary cost-sharing requirements (co-payments, deductibles) and the inclusion of other benefits that align with SES-related barriers identified by phase 1 key informants might shed further light on these issues.

Section 9.7 Limitations

This study has several limitations. First, all of the data used in the study was obtained from the CMS Web site. The data made publicly available is limited, requiring a series of assumptions to be made in designing the model. Those assumptions are laid out in the methods section. Specifically, because only low-income subsidy eligibility was available in these files, it was used as a proxy for the socioeconomic status of plan participants. Neither the number nor the percentage of plan members who are dually eligible for Medicare and Medicaid, a common proxy measure for SES are made publicly available and, as has been noted elsewhere, little data are available regarding the individual SES attributes of Medicare beneficiaries (*Accounting for Socioeconomic Status in Medicare Payment Program*, 2015).

Second, this study only looked at the years 2014 and 2015. While these years represent the transition into the full effect of the post-ACA stars methodology, they reflect a narrow window of time calling into question whether they are representative of later years. In addition, because they examine past plan practices they cannot be viewed as prognostic. Repeating the analysis to include additional years of data could assist in analyzing the policy implications of these findings.

Third, while more refined than other possible proxy measures of community SES, including the individual data elements included in the calculation of ADI, the use of ADI as proxy measure for community-level SES is not as exact. In addition, because the ADI is based on 2000 census data, it may not reflect current levels of deprivation. Finally, while ADI is published at more granular levels (nine-digit ZIP codes, ZIP code tabulation area, and U.S. Census block group code), because plan filings occur

at the county level, in order to align the ADI and the plan offerings, county-level ADI was used in this study.

Finally, this study only examined a small subset of the supplemental and enhanced benefits that a plan may offer. In addition, the use of the publicly available plan benefit package filings limited our ability to examine attributes other than benefits such as care management models, network designs and community partnerships that might, based on the phase 1 key informant feedback, impact the quality of care delivered to low SES MA participants.

The limitations of plan benefit package filings also led to the decision to include the presence or absence of a premium rather than other out-of- pocket expenditure requirements such as copayments and deductibles as a dependent variable. The presence or absence of a premium was available as a dichotomous variable, while other out-of-pocket costs (deductibles and co-payments) appear in the plan benefit package filings individually by benefit and in some cases vary within benefit. For example, many plans vary consumer out-of-pocket costs related to hospitalization based on the length of the hospitalization. The number of out-of-pocket cost variations made the use of those data beyond the scope of this analysis. However, premiums and cost sharing impact low-income beneficiaries in different ways with premiums generally a forming a barrier to coverage and cost sharing creating a barrier to access (Hudman & O'Malley, 2003). Whether the results found here would differ if the analysis were conducted using cost sharing rather than premiums as a dependent variable may be an important area for future research.

CHAPTER 10: ANALYSIS OF POLICY PROPOSALS IN PHASE 3

Section 10.1 Methods

In phase 3 of the study, a subset of phase 1 key informants, 1 representing each key informant type, was asked to complete a survey evaluating eleven of the most frequently occurring recommendations made by the 30 key informants participating in phase 1. Representative key informants were selected based on the completeness of their understanding of the details of stars methodology as displayed during their phase 1 interview as well as their availability to participate. While this small number of key informants does not represent the views of all of the individuals included in phase 1, these five individuals provided a range of opinions about which of the strategies recommended in phase 1 would be most useful in achieving the goal of improving the quality of health care delivered to low SES MA beneficiaries. The evaluation tool, a copy of which is included as included as Appendix L, was provided to each key informant via survey monkey prior and followed by an interview. Each follow-up interview was conducted by phone.

The phase 3 key informants were asked to provide feedback on 11 policy proposals which were divided into 3 groups: changes that CMS could make to the stars methodology; incentives that CMS could make available to plans to improve the quality of care those plans provide to low SES beneficiaries; and changes that CMS could make to the MA program and payment regulations. The proposals they evaluated regarding changes to the stars methodology were:

1. Stratify the results of plan performance on quality measures to reflect social and demographic characteristics of plan membership.
2. Risk adjust SES-sensitive measures for SES in addition to risk adjusting for underlying health status.

3. Refine the MA stars measure set to focus on measures that are more important to low SES populations.
4. Refine the MA stars measure set to focus on measures that are within the control of the provider or plan.
5. Measure quality at the plan benefit package level rather than at the level of the contract between CMS and the plan.
6. Refine the MA stars methodology to focus more on improvement than achievement.

The proposals they were asked to evaluate regarding incentives that CMS could make available to MA plans were:

1. Provide financial or other incentives to encourage plans to refine and enhance care coordination and care management techniques.
2. Provide financial or other incentives to encourage plans to improve access to care for low SES populations.
3. Provide financial or other incentives to encourage plans to improve access to social supports.
4. Provide financial or other incentives to encourage plans to partner with community organizations.

Finally, each key informant was asked to provide feedback on a proposal to change the current uniformity of benefit rules applicable to MA plans in order to allow more flexibility for plans to tailor benefit packages including supplemental benefits to the needs of low SES beneficiaries.

The criteria against which the key informants were asked to evaluate these proposals were:

1. The extent to which the proposal will maintain/increase plan offerings tailored to low SES communities.
2. The extent to which the proposal will improve the quality of health care in disadvantaged communities.
3. The extent to which the proposal will improve the accuracy of the MA stars methodology.
4. The extent to which the change in policy represents an improvement over the status quo.

The evaluation scale ranged from 5, which represents a strongly positive change to 1, which represents a strongly negative change. O represented "I don't know." After completing the survey, an interview was conducted with each key informant regarding the reasoning for the scores they assigned.

Section 10.2 Data Analysis Strategy

The surveys were collected electronically and evaluated both individually and as a group. Four of the five phase 3 interviews were recorded using the Tape-A-Call app for IPhone and transcribed by a professional transcriptionist via the Rev app for IPhone. The fifth interview was not recorded. Instead, notes of the discussion were taken during the interview. All documentation, including each transcript, was uploaded to a password protected Google drive. Transcripts were catalogued in the Google drive by participant type. I coded each transcript using Atlas.ti. Emergent codes were identified and clustered into categories. Because the phase 3 interviews were used merely to validate written survey results, a second coder was not used in the analysis of the phase 3 results.

Section 10.3 Proposed Changes to the Stars Measure Set

Section 10.3.1 Stratification and Risk Adjustment

In phase 1, nearly all of the key informants agreed that it was appropriate for CMS to measure quality in MA, and most expressed support for the MA stars methodology, but with some caveats. General support for the stars program accompanied a disagreement among key informants about whether the stars program actually improves the quality of care across all SES strata. In addition, nearly all of the phase 1 key informants thought that accounting for SES separately from underlying health status was appropriate.

A majority of phase 1 key informants recommended risk adjusting appropriate individual measures of quality, stratifying measurement of MA plan performance based on the attributes of plan membership, or a combination of the two. Phase 3 key informants were asked to evaluate separately the impact of risk adjusting SES-sensitive measures for SES characteristics and the impact of stratifying plan performance by social and demographic characteristics of plan participants. Opinions were split among

the four phase 3 key informants who responded to the question of the impact of stratification on maintaining or increasing plan offerings tailored to low SES communities: two key informants felt that stratification would be a strongly positive change and two felt that stratification would have no impact. The fifth key informant, the Consumer representative, scored stratification as zero, or "I don't know." Asked why, the Consumer representative explained it this way: "Looking at stratify, yeah, so on the measure I just don't know. I'm not sure if that would encourage [plans] to come into the market and serve this population or discourage them for fear of what their results might look like when stratifying that way."

All of the key informants evaluated stratification as somewhat or strongly positive on the metrics of improving the quality of health care to disadvantaged communities and improvement over the status quo. Nearly all of the key informants said the proposal would result in a somewhat positive change on these two metrics.

Key informants were divided in their responses to the proposal to risk adjust SES-sensitive measures. When evaluating whether risk adjusting SES-sensitive measures would maintain or increase plan offerings tailored to low SES communities, the respondents representing the Thought leader and Provider groups both believed that risk adjustment would result in no significant change. The three remaining key informants thought that risk adjustment would result in a positive change in the number of plan offerings tailored to low SES communities. On all other evaluative metrics, the Consumer representative graded the risk adjustment proposal as somewhat negative. In the follow-up interview the Consumer representative repeated concerns voiced by all of the phase 1 Consumer representatives regarding the possibility that risk adjustment could result in an acceptance of a lower standard of care for low SES populations. The Consumer representative put it this way: ". . . risk stratification [. . .] to me seems to expect a lower performance from the plans for people with low SES. It doesn't feel comfortable to me to say, to the plan, well you seem to be—your score isn't as high, but it's because you're working with a lower SES group, so that's okay. And so, I like the stratification more because it's just very

explicit, whereas the risk adjustment, it feels like there's—when you create the risk adjustment, you're building in some value judgments at the front."

To the contrary, all of the other phase 3 key informants graded the risk adjustment proposal as either somewhat positive or strongly positive with respect to improving the accuracy of the MA stars methodology and as an improvement over the status quo. Evaluations of the proposal's impact on the quality of care for disadvantaged communities were more mixed.

Section 10.3.2 Focusing the Measure Set on Measures More Meaningful to Low SES Populations

Another common policy proposal made by phase 1 key informants was to revise the measure set to include measures that are more meaningful to low SES populations. Examples of more meaningful measures identified by phase 1 key informants include measures that focus attention on quality for specific populations (including those with low SES); measures related to cultural competence, language access, member connection, or engagement; and measures related to care management, chronic disease/disability, and access to care.

In phase 3, I asked key informants to evaluate the impact of refining the measure set to focus on issues of importance to low SES beneficiaries. Most of the phase 3 key informants thought revising the measure set to include measures that are more meaningful to low SES populations would result in no significant change to maintaining/increasing plan offerings tailored to low SES communities. Provider representative put it this way "Plans don't make their decisions whether to increase tailored offerings based on these criteria." Similarly, the majority of respondents thought that this proposal would have no impact on the accuracy of the MA stars methodology. However, all of the key informants believed that refocusing the measure set in this way would have a positive effect on the quality of health care for disadvantaged communities. Most of the key informants (all but the Plan representative) expressed the view that it would have a positive effect over the status quo.

Section 10.3.3 Plan and Provider Control

A theme commonly identified in the phase 1 interviews was the issue of measuring plan and provider quality based on metrics outside of the plan or provider's control. In addition, while most of the phase 1 key informants thought that equivalent quality outcomes could not be ensured across SES strata, several key informants commented that equivalent care delivery, a factor largely within the control of the delivering plans and providers, was possible.

In phase 3, I asked key informants to provide feedback on refining the stars methodology to focus on measures within the control of the provider or plan. Overall, this proposal scored relatively poorly, with an overall average across all key informants and all evaluative metrics of 3.1, or just slightly higher than a score of "No significant change." The Thought leader representative said that refining the measure set to focus on measures within the plan or provider control would result in no significant change on any of the evaluation metrics and expressed concern about who should be held accountable, if not the provider and plan, on certain important quality metrics for which the provider or plan is a contributor to the measured service or outcome.

> I guess, I was neutral [. . .] because I was concerned about how well that could be defined [. . .]. I think for most quality measures it is not an either or. Like either they're under the control provider and plan or they are not. Certainly, some of the testing measures maybe are more clear-cut but a lot of the more outcome oriented quality measures, I think it is really debatable. I think, maybe also part of my thinking was if not the provider or plan but these things outside their control are important. Who is the relevant actor who is going to take responsibility?

Section 10.3.4 Measuring Quality at the Level of the Plan Benefit Package (PBP) Rather than the Contract

During phase 1, several key informants raised concerns about the fact that the MA stars methodology is applied at the level of the contract between the plan sponsor and CMS. Plan sponsors can offer any number of specific PBPs within a single contract. One phase 1 Plan representative shared the view that measuring quality at the contract level disadvantaged smaller and more local plans that are limited to a single geography and plans that offer a single or small number of PBPs.

> . . . we're a [INSERT STATE] plan. We try to cover all of [STATE] or as much as we can, whereas you have our competitors come in and kind of figure out where the better areas are [. . .]. They focus on certain targeted areas [. . .] . The other interesting thing that national players sometimes do, is they can take a four-star plan and they can apply that into [STATE] even though it's in another state. [PLAN] can't do that, so we don't have the flexibility that the national players have to get more resources, more income based on the plan offering.

Phase 2 examined the variation in the availability of certain supplemental benefits and the requirement of a premium payment identified by phase 1 key informants and associated with offsetting SES-related barriers and found no consistent relationship between the number of low-income subsidy eligible members participating in a given PBP or the level of deprivation in the county in which the PBP is offered on the availability of these benefits. A possible reason for this finding is that because many contracts include a large number of plan benefit packages offered over a large number of geographic areas, during the study period, plan sponsors did not refine the individual plan benefit package to the specific needs of plan participants or the communities in which participants reside.

To further explore this hypothesis, in phase 3, key informants were asked to evaluate a proposal to measure quality at the level of the PBP, rather than at the level of the contract between the plan sponsor and CMS. The Plan, Provider, Regulator, and Consumer representatives evaluated this proposal as a positive change on every metric. The Thought leader evaluated the proposal as resulting in no significant change on all metrics. In discussing why, the Thought leader expressed concerns about the specificity of the proposal and about whether it could be implemented.

> I guess the other concern I have about [. . .] the level of the plan benefit design package. For measures that can be done with administrative claims. I think, that you still have plenty of sample size in most cases but for things where plans to sampling and collection of data from patients or practitioners it would be much more challenging to sample and get adequate numbers at the benefit package than it is at the contract level. […] it's just the effort that will be required to potentially get those more refined conclusions, could be very substantial for measures that don't come easily from administrative claims.

Alternatively, the Regulator thought that this proposal could be implemented if the sample size parameters were set in a manner that allowed for data collection at the plan benefit package level.

Section 10.3.5 Improvement Rather than Achievement

Many phase 1 key informants discussed the greater difficulty associated with achieving high quality scores among plans serving low SES beneficiaries compared with plans serving wealthier MA beneficiaries. A few key informants recommended that the stars methodology acknowledge the difference in the level of effort required to serve low SES populations by focusing more credit than is given today under the current stars methodology for improvement rather than on achievement. Phase 3 key informants were asked to grade this recommendation as a policy proposal. This was one of the few proposals scored by any key informant as likely to have a negative effect on the MA program. The overall average score for this proposal was 3.225, the second lowest of all of the proposals. While the, the Thought leader, Regulator, and Provider representative expressed the view that the proposal would have a somewhat positive effect on 3 of the 4 evaluation metrics, the Plan representative thought it represented no significant change and the Consumer representative opined that this proposal would have a somewhat negative effect on the quality of care for disadvantaged communities and a strongly negative effect on the accuracy of the stars methodology and the status quo.

Section 10.4 Changes to the Uniformity of Benefit Requirements

Many of the phase 1 key informants said that while plans and providers can impact SES barriers to quality care, they cannot completely offset them. A substantial majority of phase 1 key informants thought that plans should be tailoring their practices to meet the needs of low SES beneficiaries, and most key informants expressed the belief that plans were already doing so at the time of the interview.

Phase 2 examined the impact of the increasing percentage of low-income subsidy eligible plan participants and county-level deprivation on whether supplemental benefits and premium requirements aligned with offsetting SES-related barriers to quality care were offered to plan participants. The results of phase 2 show that, for plans offered in 2014 and 2015, other than the inclusion of a meals benefit, the percentage of low-income subsidy eligible members participating in a PBP and the level of deprivation in the county in which the PBP was offered were not consistently associated with a higher likelihood that the

studied benefits would be included in a given plan benefit package. The results of phase 2 did, however, show that the inclusion of these benefits aligned SNP designation. Therefore, the results of phase 2 indicate that if non-SNP MA plans are tailoring their practices to the needs of low SES populations they are either doing so using supplemental and enhanced benefits other than those included in phase 2 or using techniques other than supplemental and enhanced benefits. One of the questions raised by this finding is whether the uniformity of the benefit requirements placed on MA plans negatively impacts the ability or willingness of plans to use of supplemental benefits as a means of reducing SES barriers.

Phase 3 key informants were asked to evaluate changing the uniformity of the benefit requirements imposed on MA plans in order to allow plans more flexibility to tailor benefits to the needs of low SES beneficiaries. Each of the key informants who offered an opinion (the Consumer representative scored this proposal "I don't know" on every criterion) scored it as having no impact (either positively or negatively) on the accuracy of the stars methodology. However, on three of the other metrics (maintaining or increasing offerings tailored to low SES communities, improving the quality of health care for disadvantaged communities, and improvement over the status quo), the four key informants who offered opinions each judged the proposal as positive. When asked why the proposal received zero scores, the Consumer representative said,

> We find in our work that we're often pushing for uniformity of benefits because that can sometimes be the strongest consumer protection, that everybody is entitled to a certain level of benefit. And that we grapple with how you do that, but then also provide flexibility because you often see the value and there being flexibility to do more. I guess that's how advocates think about it, you need to have this base that everybody is entitled to a certain level of benefit and then above that could be plans the options to be flexible, but never in a way that allows them to take something off of the table. Because our experience has been that often, more gets taken off than gets put on. And that once you've had more flexible benefits, all these pressures can start to decrease [. . .]. So [. . .] our concern would be that they create this concept of flexibility, but that plans use it more to limit access to what was the uniform package rather than to greatly expand services on the other side. So, there's part of me that sees a potential for it to be a real positive, and there's a part of me that feels like the history is-- has been a negative.

Section 10.5 Incentives to Improve the Quality of Care

Finally, phase 3 key informants were asked to evaluate four proposals to create incentives CMS could make available to plans to improve the quality of care received by low SES MA participants. The majority of the phase 1 key informants thought that it was realistic to be concerned that providers would abandon low SES communities if the MA stars incentives did not appropriately account for SES differences among plan populations. In addition, many of the phase 1 key informants discussed the resource barriers plans and providers face in attempting to offset SES-related barriers to care. In phase 1, several key informants recommended that incentives be created to encourage providers to serve additional low SES beneficiaries.

The phase 2 analysis found a decrease in the availability of all but one of the studied benefits during the study period (2014-2015). This could reflect decisions by plans to deploy their resources on other benefits but may also reflect the revenue reductions plans sustained during that period (discussed in Chapter 1) including the full implementation of the stars incentives.

Section 10.5.1 Incentives to Refine or Enhance Care Coordination or Care Management Techniques

When asked what plans can do to lower or remove barriers to high-quality care for low SES communities, phase 1 key informants frequently recommended the use of enhanced care management strategies, including the use of health homes, enhanced caregiver support, and revised staffing models. Phase 3 key informants were asked to evaluate the effect of providing incentives to encourage plans to refine and enhance care coordination and care management techniques. The majority of the key informants said that offering incentives would have a positive effect on all metrics, other than the accuracy of the stars methodology. However, one respondent, the Regulator, scored the proposal as resulting in no significant change on all metrics, other than the extent to which the proposal would improve the quality of health care in disadvantaged communities. She explained that, in her view, plans already are doing this under the current program.

The majority of key informants said that the proposal would have a positive effect on maintaining or increasing plan offerings tailored to low SES communities. All of the key informants thought that

offering these incentives would improve the quality of health care in disadvantaged communities. Four of the five key informants said that offering these incentives would represent an improvement over the status quo. Respondents were more mixed on whether this proposal would have an impact on the accuracy of the stars methodology.

Section 10.5.2 Incentives to Improve Access to Care

Phase 1 key informants frequently cited transportation as a significant SES-related barrier to accessing care. Several phase 1 key informants recommended the use of telehealth and telemedicine as a means to improve access to care for low SES beneficiaries.

Phase 2 examined the risk differences in the availability of both transportation and telemedicine by quartiles of county-level ADI finding that none of the comparisons between ADI levels were statistically significant at the $p>.05$ level for transportation, and only a small number of the comparisons were statistically significant for telemedicine. Phase 2 also examined the marginal effect of county-level ADI and the addition of 1% of low-income subsidy eligible membership on the inclusion of transportation and telemonitoring. In sum, phase 2 told us that while there are not consistently statistically significant differences in the likelihood of these benefits being included in a given PBP, when PBPs are offered in counties that include a higher proportion of low-income membership or which are more deprived, they are more likely to offer transportation, but less likely to offer telehealth.

In phase 3, key informants were asked for their opinion on the impact of offering incentives to plans to encourage them to improve access to care for low SES populations. All of the key informants thought that offering incentives to plans to improve access to care for low SES populations would have a positive effect on plan willingness to maintain or increase plan offerings tailored to low SES communities, improve the quality of health care in disadvantaged communities and represent an improvement over the status quo. As with the incentives to refine and enhance care management techniques, respondents were mixed on whether it would improve the accuracy of the methodology, three said it would have a positive effect and two said it would have no effect.

Section 10.5.3 Incentives to Encourage Access to Social Supports

Many of the phase 1 key informants discussed the need to leverage and align social supports, such as services designed to ameliorate housing and food insecurity, with health care. Phase 2 examined whether MA plans that serve higher proportions of low SES beneficiaries or are offered in more deprived counties are more likely to offer meals and nutritional counseling as a part of their plan benefit packages. For meals, in both 2014 and 2015, the risk difference of the inclusion of a meals benefit increased by quintile of deprivation, meaning the higher the level of deprivation in the county, the more likely the PBP was to include a meals benefit. However, the opposite was true for the nutrition benefit. The PBPs offered in the least deprived communities were more likely to offer a nutrition benefit than those in the most deprived communities.

Phase 3 key informants were asked to evaluate a proposal to offer plans financial or other incentives to improve access to social supports. All five phase 3 key informants agreed that providing plans with financial or other incentives to improve access to social supports would have a positive effect on the quality of health care in disadvantaged communities and would represent an improvement over the status quo. The key informants differed in their opinions about whether incentivizing access to social supports would maintain or increase plan offerings tailored to low SES communities, with four thinking that incentivizing access to social supports would be positive and one scoring the proposal as likely to result in no significant change. This proposal was viewed as particularly impactful by the Plan and Provider representatives, with the Plan representative scoring it as a strongly positive change across the board and the Provider representative scoring it as a strongly positive change on all metrics, other than improving the accuracy of the stars methodology. In describing the high score, the Plan representative said “The price of ignoring the social service community is the healthcare community is under performing and it's less efficient than it could be. We need to get past this HIPAA stuff and find a way to integrate the medical social continuum so the information highway is part of that.”

As with the two previous incentive proposals, respondents varied on whether providing incentives to improve access to social supports would impact the accuracy of the stars methodology.

Section 10.5.4 Incentives to Partner with Community Organizations

The final incentive evaluated by key informants was the idea of providing financial or other incentives to encourage plans to partner with community organizations. Phase 1 key informants frequently identified the resources available through community organizations as a critical component in lowering or removing SES-related barriers to high-quality care. In phase 3 each of the key informants agreed that providing incentives to partner with community organizations would be an improvement over the status quo, would improve the quality of care to disadvantaged communities, and would not have an impact on the accuracy of the stars methodology. There was disagreement on the impact this proposal would have on maintaining/increasing plan offerings tailored to low SES populations. Three key informants thought that it would have a strongly positive impact but two reported either that it would result in no change or that they did not know the impact. In describing the value of increasing the involvement of community organizations, the Plan representative said,

> There's so many dimensions to this but the medical community, and I'll include plans in that, insurance plans, have really not given community based organizations a seat at the table. They typically aren't funded by the medical funding stream for their services and so they're second class citizens if you will, but yet they have a great influence. [. . .] They're the ones who provide daycare services, they're the group homes that probably know if somebody has got an appointment with the doctor or not and so on. I think to the extent that they're engaged in the information highway, so they have access if I'm a group home member I can go to a portal and find out what meds my resident is on. And I will pay attention to whether they're adherent to their medication and I do want to be pinged when they have a doctor's appointment so I can make sure that I arrange for transportation to the doctor's appointment and so on. I can be very helpful as a group home parent in making sure my residents healthcare needs are taken care of. I can be an active participant on the care team if I'm part of that information highway. And even more so, if my reimbursement is also tied to performance measures to healthcare performance measures.

Finally, none of the key informants expressed the view that creating incentives to encourage plans to partner with community organizations would improve the accuracy of the stars methodology.

Section 10.5.5 Overall Evaluations of the Incentive Proposals

Looking at the feedback on the incentive proposals by respondent type, the Provider and Plan representatives rated the incentive proposals as somewhat or strongly positive across the board on every metric, except for the impact on the accuracy of the stars program. On the other evaluative metrics, the Regulator scored three of the four proposals positively. However, the Regulator did not think incentives to refine and enhance care coordination and care management techniques would yield a significant change. The Consumer representative and Thought Leader also were positive about the four incentive proposals on the criteria of the extent to which the proposal will improve the quality of health care in disadvantaged communities and improvement over the status quo rating, but were less positive about the proposal to provide incentives to partner with community organizations with respect to the extent to which the proposal would maintain or increase plans tailored to low SES communities.

Section 10.6 Weighing the Options

Each of the policy proposals presented to the phase 3 key informants was positively evaluated on some or all of the evaluative metrics and by more than one of the key respondents. Table 19 presents the overall average scores by proposal. The average was calculated by weighting each evaluative metric equally and removing rankings of zero or "I don't know" from the calculation. Proposals highlighted in blue are those that achieved an overall average score of 4 or more, meaning that, on average, the proposal was viewed by all key informants as a somewhat positive change.

As discussed previously, the results of this phase of the research reflect a convenience sample of five key informants selected to represent each of the key informant types included in phase 1. Each key informant was selected to participate in phase 1 based on their previous engagement on the issue and their knowledge of the MA stars program and to participate in phase 3 based on the detailed knowledge of the MA stars program that they displayed in their phase 1 interview and their availability to participate. As a result, their opinions provide useful insight to inform this policy analysis. However, given the small

sample size and the qualitative nature of the research, these results should not be viewed as generalizable to other interested stakeholders.

Table 20. Overall average scores

Proposal	Overall average score on all factors (zeros removed)
Stars methodology	
Stratify quality results based on characteristics of plan participants	4.1
Risk adjust SES-sensitive quality measures	3.8
Refine methodology to focus on measures important to low SES populations	3.8
Refine the stars measure set to focus on measures within the control of the provider or plan	3.1
Measure quality at the plan benefit package level, rather than at the level of the contract between CMS and the plan	4.15
Refine the measure set to focus more on improvement than achievement	3.225
Incentives	
Provide financial or other incentives to encourage plans to refine and enhance care coordination and care management techniques (e.g., health homes, staffing models, caregiver support)	3.85
Provide financial or other incentives to encourage plans to improve access to care for low SES populations	4.05
Provide financial or other incentives to encourage plans to improve access to social support	4.15
Provide financial or other incentives to encourage plans to partner with community organizations	3.9125
Medicare policy	
Change the uniformity of benefit rules	4.125

Table 21 also provides the average score for each proposal by evaluative metric. Scores were calculated in the same manner, removing from the averages any zero or "I don't know" score.

Table 21. Averages by evaluation criteria

	Extent to which the proposal will maintain/increase plan offerings tailored to low SES communities	Extent to which the proposal will improve the quality of health care in disadvantaged communities	Extent to which the proposal improves the accuracy of the MA stars methodology	Extent to which the change in policy represents an improvement over the status quo
Stars methodology				
Stratify the results of plan performance on quality measures to reflect social and demographic characteristics of plan membership.	4	4.2	4	4.2
Risk adjust SES sensitive measures for SES in addition to risk adjusting for underlying health status	3.8	3.4	4	4
Refine the measure set to focus on measures that are more important to low SES populations	3.4	4.6	3.2	4
Refine the measure set to focus on measures that are within the control of the provider or plan	3.4	3	3	3
Measure quality at the plan benefit package level, rather than at the level of the contract between CMS and the plan	4	4.2	4.2	4.2
Refine the measure set to focus more on improvement than achievement	3.5	3.2	3	3.2
Incentives				
Provide financial or other incentives to encourage plans to refine and enhance care coordination and care management techniques	3.8	4.2	3.4	4
Provide financial or other incentives to encourage plans to improve access to care for low SES populations	4.2	4.4	3.4	4.2
Provide financial or other incentives to encourage plans to improve access to social supports	4.2	4.4	3.6	4.4
Provide financial or other incentives to encourage plans to partner with community organizations	4.25	4.4	3	4

	Extent to which the proposal will maintain/increase plan offerings tailored to low SES communities	Extent to which the proposal will improve the quality of health care in disadvantaged communities	Extent to which the proposal improves the accuracy of the MA stars methodology	Extent to which the change in policy represents an improvement over the status quo
Medicare policy				
Changing the current uniformity of benefit rules applicable to MA plans in order to allow more flexibility for plans to tailor benefit packages including supplemental benefits to the needs of low SES beneficiaries.	4.5	4.5	3	4.5

Figure 4 presents the results from a different perspective; it shows how each of the options was scored by key informant type. Each triangle represents the average score across all of the evaluation criteria. The triangles represent key informants, and overlapping triangles represent that key informants graded the proposal with the same average score. The absence of a triangle for a key informant means that the respondent graded the proposal with all zeros.

Figure 4. Proposals as scored by phase 3 key informants

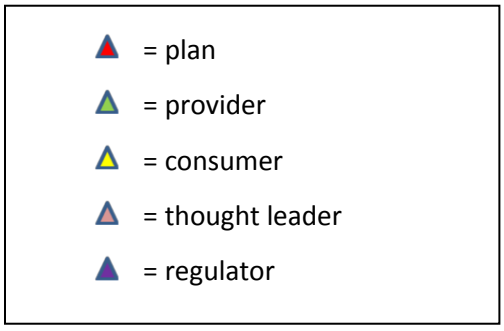
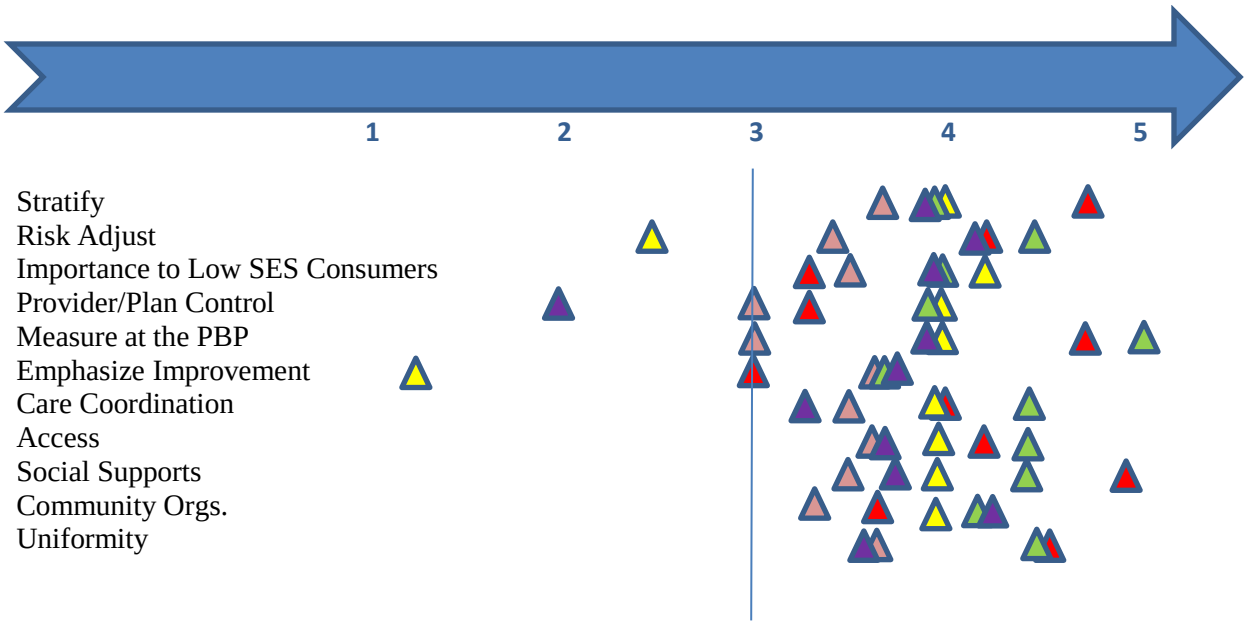


Figure 5. Proposals as scored by phase 3 key informants



As these tables and figures show, with the exception of 4 proposals which were evaluated by one or more key informants as either likely to be detrimental or to not result in an improvement over the status quo, the other proposals garnered significant support and were tightly clustered between 3.8 and 4.2. Given this clustering, distinctions between the level of support for the individual proposals that did not have significant opposition are difficult to make. Further research would be required to prioritize from amongst these proposals.

The proposals that were viewed by at least 1 key informant as likely to be detrimental were risk adjustment, revising the stars measures set to focus on measures within the control of the plan or provider, and emphasizing improvement over achievement. The proposal to change the uniformity of benefits requirement is the only proposal that was voted on by only 4 of the 5 phase 3 key informants. This occurred because the Consumer representative graded the proposal with zeros, or "I don't know," across all evaluative metrics. During the follow-up interview, the Consumer representative explained the grading choice by expressing significant concerns about whether the proposal would reduce benefits currently available to consumers. While this only reflects the opinion of one Consumer leader, this person was selected to participate in both phases 1 and 3 because he is a recognized leader in the community of MA

consumer advocates. Thus, based on these concerns, it is possible that a policy platform that includes a proposal revising the uniformity of benefit requirements could, at least in the short-term, garner significant opposition from the Consumer community.

Four other proposals received an average overall score of 4 (a somewhat positive change) from the phase 3 key informants. Two of the incentive proposals: providing incentives to improve access and providing incentives to improve connections to social services each received an average score of 4.4 and two proposals focused on improvements to the stars methodology: stratifying results based on plan member characteristics and measuring quality at the PBP level, rather than the contract level, each received an average score of 4.2.

Section 10.6.1 Limitations

The views of the five key informants included in phase 3 are limited to the opinions of those individuals. As discussed, the phase 3 key informants represent a subset of phase 1 key informants all of whom were selected as a result of their active engagement on MA and their research, policy statements, and/or advocacy engagement on the issue of SES and quality measurement in Medicare or MA. In addition, phase 3 key informants were each selected as a result of the detailed knowledge of the stars methodology they evidenced during the phase 1 interviews. However, it is possible that the perspectives voiced in phase 3 may not accurately reflect the view of the broader stakeholder community which each phase 3 key informant was chosen to represent. In addition, while there may have been consensus among the five phase 3 key informants regarding a particular proposal or proposals, that does not mean that all stakeholders or organizations would concur in their views.

CHAPTER 11: PLAN FOR CHANGE

As discussed in Chapter 7, when I commenced this research I was employed by an MA health plan sponsor. My role at that plan sponsor included state and federal advocacy. As a result, I originally intended to create an advocacy-based plan for change focused at the federal level. During the course of this research I accepted a new position as the Chief of Long Term Services and Supports for MassHealth, the Massachusetts Medicaid program. As a result, my plan for change has been revised to focus on efforts my team and I are currently spearheading in Massachusetts. These efforts include the development of a quality benchmarking, measurement, and reporting program to be implemented in both the state's fully integrated DSNP program, Senior Care Options (SCO), and the Commonwealth's other long term services and support programs all of which serve large numbers of dually eligible beneficiaries.

This revised plan for change leverages the Kotter model of leading change (Kotter, 1996) to support internal changes in the MassHealth program for dual eligible members, and the agenda building and public education model of policy practice (Jansson, 2013). It build on the recommendations identified in phases 1-3 of this research as well as the recent work of the NAM and ASPE.

Kotter identified 8 steps to leading change: establishing a sense of urgency; creating a guiding coalition; developing vision and strategy; communicating the change vision; empowering employees to take broad-based action; generating short term wins; consolidating gains and producing more change; and anchoring new approaches in culture. (Kotter, 1996) Jansson and colleagues describe eight models of policy practice that can be used individually or in combination (Jansson, 2013). The agenda building and public education advocacy model they describe is similar to the first two steps of the Kotter model. It requires analysis and understanding of the policy landscape, creating a sense of urgency, and activating support via a policy entrepreneur and guiding coalition. (Jansson, 2013)

Section 11.1 Background/Understanding the Policy Landscape

The MassHealth Office of Long Term Services and Supports (OLTSS) which I lead administers the Senior Care Options (SCO) program. SCO is the Commonwealth of Massachusetts' fully integrated DSNP program. In order for an MA plan to offer a DSNP in the Commonwealth that plan must be selected as a SCO by OLTSS. SCO plans offer the full package of Medicare Part A, B and D as well as supplemental MassHealth covered services including long term services and supports. The quality of the care delivered by SCO plans is judged under the MA stars program. For the year 2017, there are 6 plans participating in SCO. Unlike most DSNP plans nationally, SCO plans perform well under the MA stars program. Of the 6 plans, one is a 5 star plan, 3 are 4.5 stars, 1 is 3.5 stars and one is too small and too new to be measured.

In addition to the SCO program, MassHealth and CMS jointly administer the One Care program which is a fully integrated demonstration program for non-elderly disabled dual eligible individuals. While One Care imposes supplemental measures of quality on the One Care participating plans which are aligned with the care coordination, community integration and long term services and supports goals of the program, SCO does not today include supplemental measures.

Additionally, MassHealth is currently in the midst of a wholesale restructuring of the entire program. As a part of that restructuring over the next 4 years MassHealth is planning to leverage the SCO and One Care models to implement a fully integrated acute and long term care program modeled on SCO and One Care for people eligible for MassHealth but not eligible for Medicare.

In order to improve the quality of care delivered through the existing SCO and fee for service programs and to ready the provider community for the planned fully integrated program, OLTSS is currently developing quality measures to be applied as supplemental quality measures in SCO and to each of the long term services and supports programs funded by MassHealth. MassHealth plans to initiate these measurement programs in 2018 and anticipates that these measurement programs will become a base for the development of a post-acute quality methodology to be used in the fully integrated program which is set to begin in 2019 or 2020.

Section 11.2 Establishing a Sense of Urgency

The activity described above is creating an external sense of urgency around the need to address the equity of the quality measurement programs used for value based payment in MassHealth. Additionally, MassHealth is currently in the midst of procuring the services of a third party administrator (TPA) for long term services and supports which will, among other things, implement provider-specific quality and utilization benchmarks and scorecards. Finally, OLTSS is currently updating each of the regulations governing MassHealth's long term services and supports portfolio. These efforts together have created a high level of urgency around the implementation of quality measurement in this portfolio of programs and a compelling need to assure that the measurement programs are fair, equitable and effective in improving the quality of care for the beneficiaries we serve.

Section 11.3 Establishing a Guiding Coalition

Both Kotter and Jansson described the importance of coalition building in driving change.(Jansson, 2013; Kotter, 1996) In order to effectively address the issue of care quality for low-SES Medicare beneficiaries participating in MassHealth, the guiding coalition will be formed in Massachusetts but will seek to include national stakeholders in order to inform those stakeholders' advocacy efforts on the federal level.

Internal and external stakeholders will be engaged and asked to participate. Key informants who participated in this study, academics and researchers whose work is referenced in the review of the literature, members of the NAM Committee on Accounting for Socioeconomic Status in Medicare Payment Programs, SCO beneficiaries, SCO plans, MassHealth providers and other relevant stakeholders will be asked to participate in the coalition. Appendix O outlines the various groups of stakeholders who have expressed an interest in the issue of the impact of SES-related characteristics on performance under the stars program or who are actively engaged on the related issue of the impact of SES-related characteristics on performance under the other Medicare quality measurement programs. Each stakeholder's likely level of interest in the initiative, what might inspire each of them to participate in the

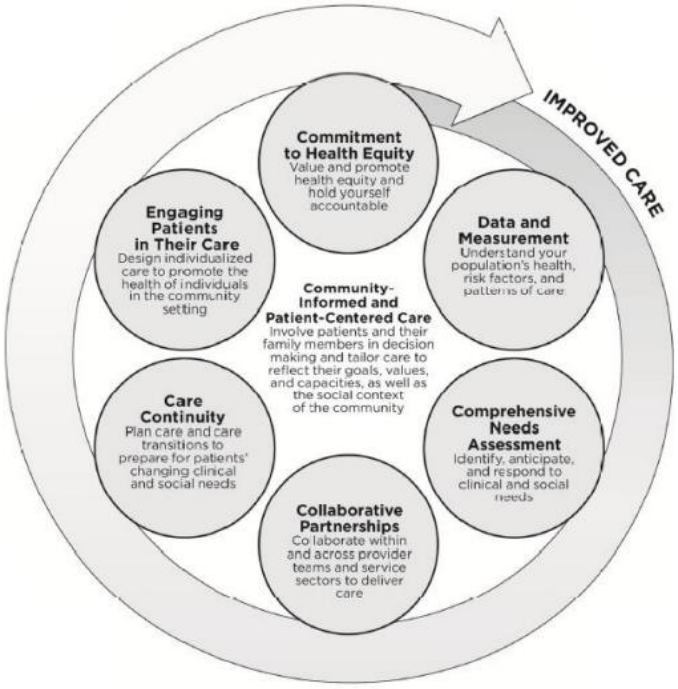
coalition, and the level of influence they are likely to bring to bear are also described in Appendix O. Organizations representing each of the listed nongovernmental stakeholder types will be engaged as potential coalition partners.

Identified stakeholders will be invited to participate in an organizational meeting of the coalition. In advance of that meeting, a short summary of the research contained in the preceding chapters of this study (no more than ten pages), a second short summary describing the results of the review of the literature, and links to the recent ASPE and NAM studies will be circulated to meeting participants in order to prepare them for the initial dialogue.

Section 11.4 Developing a Vision and Strategy

The initial meeting of the coalition will focus on developing a shared vision for a quality measurement system that improves quality across all socioeconomic strata. The initial agenda will focus on the conceptual model outlined by the NAM Committee on Accounting for Socioeconomic Status in Medicare Payment Programs report on Systems Practice for the Care of Socially at Risk Populations and the recommendations included in the ASPE which appears below.

Figure 6. Systems practices for the care of socially at risk populations



Source: National Academies of Sciences, Engineering, and Medicine. Accounting for Social Risk Factors in Medicare Payment; Systems Practices for the Care of Socially At-Risk Populations. Washington, D.C.: National Academies of Sciences, Engineering, and Medicine; 2016.

(National Academy of Sciences, Engineering, and Medicine 2016b, 2016; *Report to Congress: Social Risk Factors and Performance Under Medicare's Value-Based Purchasing Programs*, 2016)

After presenting and explaining this framework and listening to feedback, over the course of a series of follow up meetings, Coalition members will be guided through a review of the recommendations contained in the ASPE and NAM studies as well as in phases 1 and 3 of this research and asked to provide recommendations to OLTSS regarding methods that we could employ to account for and offset SES-related barriers to high quality performance under the SCO supplemental measures and the other planned measures.

OLTSS is currently in the midst of a technical assistance grant from CMS through which we are receiving coaching and support to develop domains of measurement and a draft set of measures individually for each long term service and support program offered by MassHealth and supplemental measures for the SCO program. Coalition partners will be asked to review and provide feedback on the

draft measure sets and to collaborate on mechanisms to account for SES-related and other risk factors that have been shown to impact performance on any included quality measures. Consistent with the results of this study and the work by NAM and ASPE, mechanisms to account for SES-related and other risk factors could include the mechanisms of measurement (including but not limited to inclusion and exclusion criteria, risk adjustment, stratification and benchmarking improvement as opposed to or in combination with achievement), payment policies such as differential or incentive payment, or the provision of technical assistance to providers serving beneficiaries with specific risk factors. OLTSS has recently submitted an additional request to CMS for assistance with modeling the effect the draft measures. Should we receive that assistance, the modeling could include stratification of the measures by enrollee health, social and functional attributes and, if possible, risk adjustment for certain risk attributes. The results of that modeling will also be shared with the Coalition to inform their deliberations.

Section 11.5 Communicating the Change Vision

To further the goals of this plan for change, an accompanying communications strategy will be developed. The communications strategy will be centered on the importance of quality measurement in moving MassHealth toward value based purchasing, the need to account for population differences among the broad populations served by SCO and the MassHealth LTSS programs based on the evidence derived from the literature, and the efforts MassHealth is taking to improve the quality of care for MassHealth and SCO beneficiaries while appropriately accounting for SES-related barriers to quality care delivery.

As an agency of state government MassHealth's work is public record. In order to build public trust in the programs MassHealth administers, descriptions of those programs and, to the extent they are available, outcomes data are routinely shared with the public. In order to assure that these efforts are effectively communicated, the MassHealht communications team will be asked to assist in describing the quality work that is currently under way and to assist the OLTSS staff in the development/refinement of fact sheets and other materials for public distribution. Communications tools will include press releases related to the launch of the initiative, formation of the coalition and implementation and outcomes of the

program, updates on the SCO and OLTSS Web pages, and social media outlets as deemed appropriate by MassHealth communications staff.

Once a conceptual model and mechanisms to account for SES-related barriers to quality performance has been agreed to by the coalition, a whitepaper describing the planned measurement strategy will be communicated at the state level to interested stakeholders including those described in Appendix O. In addition, the information will be shared with the experts providing us technical assistance through the CMS Medicaid Innovation Accelerator Program, states engaged in similar efforts and organizations representing state Medicaid, aging and disability agencies such as the National Association of Medicaid Directors, National Association of State Units on Aging and Disability and National Governors Association to inform the debate more broadly.

A resource library will be created (if approved, on the OLTSS website) which includes the literature referenced in the review, this study, the NAM and ASPE studies and additional materials offered by coalition partners. Each coalition partner will be requested to identify an external communicator to speak to the coalition's efforts. Engagement with media outlets on behalf of MassHealth will be conducted by MassHealth communications.

Section 11.6 Empowering Employees to Take Broad-Based Action

As discussed, implementation of supplemental measures for the SCO program is planned for 2018 and for the MassHealth LTSS programs will begin in 2018. Once the conceptual model and mechanisms to appropriately address SES-related barriers is defined by the coalition and agreed to by MassHealth, each of the employees leading the SCO and LTSS programs will be empowered to lead subcommittees of coalition members in the development of program-specific measures.

These program-specific efforts will be supported by the selected TPA who will be charged with quality measurement benchmarking and analytics and will be informed by the technical assistance we are receiving from CMS. As soon as the TPA is engaged, an analytics plan will be developed which includes reporting of an initial set of performance metrics which can be evaluated using administrative data on a

quarterly basis. As the quality measures sets are established, they will be reported annually. Program managers will be empowered to work with providers to help them to understand their performance relative both to their peers and the Commonwealth's highest performers.

Section 11.7 Generating Short Term Wins

As each of the landmarks of this project are met: alignment on a conceptual model, identification of mechanisms to account for SES-related barriers to quality measurement, identification of measures to be tested by program, commencement of measurement, etc. those "wins" will be communicated internally to the team and externally to and through the guiding coalition. As discussed, benchmarks will be developed and performance will be tracked over time.

Section 11.8 Consolidating Gains and Producing More Change

Short term wins will reported on an annual basis and will be shared internally and externally. Briefings will be held to share the results with coalition partners, with key stakeholders, with colleagues at CMS, and with national organizations that represent states and relevant state agencies. In addition, the work in Massachusetts may help inform the national dialogue on this issue. There is a potential "policy window" opening that may occur at the national level to incorporate enrollee SES characteristics into the MA program. Both NAM and ASPE have made recommendations on addressing social risk factors in MA. In addition, with Republicans controlling both Congress and the Executive branch, the political climate may be more supportive of making changes needed to further support Medicare Advantage plans. One example of Congressional leadership support for legislation to reform MA that is in line with this dissertation can be found in Speaker Ryan's health reform plan, A Better Way. which includes several recommendations similar to those made by phase 1 key informants including revising the uniformity of benefit requirements to allow for the use of value based insurance design and risk adjustment for socioeconomic status or "another adjustment deemed necessary" (Ryan, 2016). Thus, with these recent changes at the federal level, it is possible that proposals to implement changes to the MA stars program to appropriately account for enrollee SES characteristics could be well received at the Federal level. The

MassHealth experience of designing appropriate quality measurement systems to address the needs of dual eligibles and other low-income adults can help inform federal efforts.

In order to share the results of MassHealth's efforts, the results of these efforts will be packaged and proposed as conference topics at those organization's conferences with the goal of aligning similarly situated states and stakeholders to build support for equitable and effective quality measurement in MA and other federal programs.

Section 11.9 Anchoring New Approaches in Culture

The information gathered through this process will inform culture that focuses on equity in the context of quality. The measures that prove fruitful in this initial stage will inform the measures for the fully integrated Medicaid only program planned for 2019 or 2020. And will inform efforts at the federal level to address the accounting for SES-related risk factors in Medicare quality measurement as a part of a broader Medicare restructuring effort.

CHAPTER 12: IRB AND CONFIDENTIALITY ISSUES

Phase 2 of this research involved the analysis of secondary data. The research is based on publicly available third-party data. For this reason, it was exempt by the UNC Institutional Review Board (UNC IRB). Phases 1 and 3 of this study relied on key informant interviews. However, each of the key informants was asked to participate in their professional capacity. As a result, these phases of the study were also exempted by the UNC IRB.

The primary risk to the subjects of this study was the maintenance of confidentiality. Each key informant was provided, in advance of participating, a letter describing the study. Verbal confirmation of each participant's consent was obtained by telephone. Key informants were not identified by name, but, instead, by a numeric identifier known only to me. All materials related to the interviews, including notes, recordings, and transcripts, were identified with the numerical identifier. All interview materials were stored in a password-protected Google Drive using a password known only to me. Interviews took place in an office or other secluded space, except in one case, in which the key informant chose the location. I conducted the document review. The second coder was done in private settings, and any printed documents were shredded.

CHAPTER 13: LIMITATIONS OF THE RESEARCH

Phases 1 and 3 of the research included a limited number of key informant interviews. While the research was designed to identify key stakeholders to serve as key informants, this research was not designed to obtain input from every individual or group with a perspective on quality measurement in Medicare or MA. Additionally, because these interviews represent opinions of the interviewed individuals, they cannot be viewed as conclusive or causative. Rather, their purpose was to gain an assessment of what the perceived barriers were and whether there was any consensus among key informant groups on solutions to the identified barriers. This, in turn, helped to inform the advocacy strategy described in the plan for change.

Phase 2 of this research was limited to evaluating the presence or absence of a limited subset of benefits and plan design features. It examined only the years 2014 and 2015. While these years represent the transition into the full effect of the post-ACA stars methodology, they reflect a narrow window of time calling into question whether they are representative of later years. In addition, because they examine past plan practices they cannot be viewed as prognostic. Repeating the analysis to include additional years of data could assist in analysis of the policy implications of these findings. In addition, this study compared the effect of a limited number of attributes of the plans and the locations in which they are offered. As such, the results of this analysis cannot be viewed as a complete analysis of all possible benefit designs, plan types, or geographic attributes. In addition, while the analysis began with all MA plan contracts and benefit packages, some contracts were eliminated to make the analysis possible (as described in the phase 2 methods section). Third, because of the limitations of the information made publicly available by CMS, certain methodological assumptions were necessary to make analysis possible. Those assumptions are described in detail in the phase 2 methods section. Fourth, while more refined than other possible proxy measures of community SES, including the individual data elements

included in the calculation of ADI, the use of ADI as proxy measure for community-level SES is not as exact. In addition, because the ADI is based on 2000 census data may not reflect current levels of deprivation. Finally, while ADI is published at more granular levels (nine-digit ZIP codes, ZIP code tabulation area, and U.S. Census block group code), because plan filings occur at the county level, in order to align the ADI and the plan offerings, county-level ADI was used in this study. Finally, the study included the presence or absence of a premium, a dichotomous variable, as a measure of cost to the beneficiary. Premiums impact low-income beneficiaries in different ways than other cost-sharing obligations with premiums generally forming a barrier to coverage and cost sharing creating a barrier to access (Hudman & O'Malley, 2003). Whether the results found here would differ if the analysis were conducted using cost sharing rather than premiums as a dependent variable may be an important area for future research.

APPENDIX A: KEY INFORMANT QUESTIONNAIRE

Introduction

Thank you for your willingness to participate in this interview. As you know, the Medicare stars program is designed to improve the quality of care provided to Medicare beneficiaries enrolled in the Medicare Advantage program. It does this by assigning summary rating scores of between one and five stars based on certain performance measures. The Affordable Care Act (ACA) changed the Medicare stars program incorporating the stars methodology into the plan payment methodology. In addition, CMS continues to have discretionary authority to terminate plans with low star scores. As a result, today, plans with fewer than three stars for 3 years in either Medicare parts C or D may be subject to program termination while those with four or more stars receive incentive payments.

My research is looking into the potential impact of the Medicare stars quality and payment system on health plan performance, particularly as it relates to individuals and communities with lower socioeconomic (SES) status. Specifically, the purpose of this study is to understand whether Medicare Advantage plans that serve high proportions of individuals with low SES status have or intend to modify their policies and practices in light of the changes to the Medicare stars program, and if so, to explore the policy implications of any identified changes. You have been asked to participate in this study because you are [an advocate for Medicare recipients, an expert in Medicare, an expert in quality measurement].

I am conducting this interview as a part of my dissertation for the Doctorate of Public Health program at the University of North Carolina Chapel Hill. The results of this study will be used to make recommendations to health plans and policy makers to effectively address the needs of Medicare beneficiaries who have SES characteristics associated with poorer health outcomes.

As a (insert appropriate stakeholder group), your participation is a critical component of in gaining a complete understanding of the implications of the stars methodology on plans serving large proportions of members with lower SES and the efforts, if any, plans have taken to address those the unique needs of low SES beneficiaries. The content of this interview will be kept confidential. Your answers will be presented in summary form and will not be attributed to you or your organization. This

interview is completely voluntary. You many decline to participate at any time, end an interview in progress or request that your replies not be used after the interview has been completed. I would like to audio record this interview. May I have your permission to record it?

Before I proceed, do you have any questions?

Impact of SES Characteristics on Quality Measurement

I'd like to ask you a few questions about the impact of low SES status on the Medicare stars rating system. When I refer to people with low SES status, I am using the Agency for Healthcare Quality and Research's definition of SES as "…a multidimensional concept. Among the dimensions typically associated with SES are occupational status, educational achievement, income, poverty, and wealth."(Agency for Healthcare Research and Quality, 2012)

Background Information

1. Can you provide me with some background information on your involvement with the Medicare Advantage program? For example, are you a plan administrator, regulator, advocate, provider, etc.?
2. What is your role, if any, in quality measurement or quality improvement?

Medicare Stars

1. Do you support the use of quality measurement in the Medicare program? Why or why not?
2. Do you support the current Medicare stars methodology? Why or why not?
3. Do you think that the current Medicare stars methodology improves the delivery of quality care to beneficiaries in all SES strata?
    a. Why or why not?
    b. What impact do you think the current Medicare stars methodology has on people with lower SES status?

Impact of SES Characteristics on Provider and Plan Performance

1. Do you think that patient SES characteristics impact plan and provider performance on quality measures? (If not, skip to question 6)
    a. If so, in what way?
    b. Are there specific SES characteristics that you believe to have more or less impact on plan or provider quality performance?
    c. Do you think that health plans and providers can effectively address these factors?
        i. If so, how? Examples might include the provision of certain supplemental benefits, offering a culturally competent care management program or provider network, increasing resources to respond to patient's social risk, cultural stigma?
        ii. If not, why not?
2. Do you think that SES characteristics have a greater impact on plan or provider performance on specific types of quality measures? By this I mean do SES characteristics have a greater or lesser impact on plan or provider performance on process, intermediate outcome, outcome, and/or patient experience of care measures? (I'm glad to define these terms if you would like).
    a. If yes, what types of measure are most impacted?
3. In light of known health, economic, educational and environmental disparities— can a health plan or provider ensure equivalent care quality for all beneficiaries? Why or why not?
4. In general, do you think that it is appropriate to account for SES characteristics in quality measurement separately from adjusting for underlying health status?
    a. Why or why not?
    b. Would your answer differ if the measure of quality is a process of care measure or an outcome measure?
    c. If no, are there any circumstances when you believe modifying the measurement methodology would be appropriate?
        i. If yes, what are those?

5. If you think it is not appropriate to adjust quality measures for SES characteristics, should CMS include other strategies to address potential disparities in quality measures based on the SES of the plan's patient population. For example:
    a. Exclude measures that are sensitive to these characteristics?
    b. Weight sensitive measures differently?
    c. Provide additional payments to plans serving large proportions of people with low SES to pay for services and programs to address disparities caused by SES characteristics?
    d. Stratify the measurement system at the plan level to compare plans with similar proportions of low SES membership against one another?
    e. Are there other strategies regulators could employ to normalize for these factors without adjusting, weighting or excluding individual measures?
6. Some commentators believe that plans and providers will ultimately shy away from serving people with more SES risk factors because of the Medicare stars payment incentives. Do you think that this is a valid concern?
    a. If yes, what can be done to ameliorate that concern?
    b. If not, why not?
7. In summary, are there any changes needed in the Medicare Advantage stars methodology to ensure the highest quality of care is delivered to low SES communities? If yes, please explain.

Questions only to be asked of key informants who have knowledge of plan practices (likely regulators, representatives of plans and providers and their trade association):

How Health Plans Are Responding to the *Changes* to the Medicare *Stars Program*

1. Are there barriers you have identified to effectively improving quality among plans serving high proportions of members with SES challenges?
    a. If yes, what are they and how, in your opinion, might those barriers be overcome?

2. Have you observed an increase or a decrease in these population-tailored strategies in the last 3 years? Are health plans varying their service areas, networks, customer service, provider relations, care management, product offerings, covered services, and/or marketing strategies based on SES makeup of the plan's membership or service area?
    a. If yes, in what ways?
        i. What are the specific changes you have observed in terms of changes to service areas, networks, customer services, provider relations, care management, product offering, covered services, and/or marketing strategies?
        ii. Are these changes for the purpose of addressing SES barriers or for other reasons?
            1. If other reasons, what are they?
    b. If no,
        i. What changes in overall plan practices have you observed? For example, are plans narrowing networks in all communities regardless of SES characteristics? Expanding or contracting the communities served under a single health plan contract?
    c. Should plans tailor their practices to meet the needs of enrollees with specific SES challenges such as low income and low educational attainment? If so, how? Why? What opportunities and barriers have you observed or do you anticipate facing plans seeking to tailor their practices in this way?
3. Are there any specific strategies or tactics employed by plans or their providers that you have observed to be particularly effective at improving quality of care among plans serving high proportions of members with SES challenges? What are they and how have they been effective?

APPENDIX B: MAJOR CONCEPTS

Area Deprivation Index (ADI): The area deprivation index is a geographic area-based measure of the socioeconomic deprivation. A higher ADI score represents a higher level of deprivation. Generated by the Health Innovation Program at the University of Wisconsin it includes 17 variables related to the population age, employment, income, home value, housing cost, poverty level, single-parent households with children under 18 years of age, households without a telephone, households without complete plumbing and households with more than one person per room in a given geography (Health Innovation Program, 2014).

Consumer Assessment of Healthcare Providers & Systems (CAHPS): The CAHPS surveys assess patient access to and experiences with care. There are CAHPS surveys for a wide array of health care provider settings. There has been a CAHPS survey of Medicare Advantage and Medicare Prescription Drug Plans since 1998. Survey participants represent a sample of health plan members who have participated in the plan for six months or longer. The results are publicly reported and are one of the data sources on which the MA stars methodology is based (Agency for Healthcare Quality Research, 2014) .

Disease-modifying antirheuimatic drugs (DMARDs): "agents that apparently alter the course and progression of rheumatoid arthritis, as opposed to more rapidly acting substances that suppress inflammation and decrease pain, but do not prevent cartilage or bone erosion or progressive disability" (Stedman's Medical Dictionary, 2008).

Healthcare Effectiveness Data and Information Set (HEDIS): HEDIS is a set of health quality measures. It is developed and administered by the National Committee for Quality Assurance (NCQA). According to NCQA, HEDIS is used by more than 90% of U.S. health plans. The full HEDIS measurement set includes 80 measures. (National Committee for Quality Assurance) 35 HEDIS measures are included in the MA stars methodology in 2016 (*Medicare 2016 Part C & D Star Rating Technical Notes*, 2016).

Health Outcomes Survey (HOS): The Medicare Health Outcomes Survey (HOS) is a survey of patient experiences in in Medicare Advantage. Survey participants are chosen based on a random sample

of individuals enrolled in each Medicare Advantage plan. HOS is conducted every biennially. The version now in use (v.2.5) has been in place since 2013 (Health Services Advisory Group, 2014).

Medicaid: Medicaid is a public health insurance program for individuals who are poor and individuals who are both poor and disabled. It is administered jointly by the federal and state governments. The laws governing the Medicaid program appear at title XIX of the Social Security Act, 42 U.S.C. §§ 1396 et seq. (Social Security Administration).

Medicare: Medicare is an insurance program for older and disabled Americans. Medicare has four parts: part A covers hospitalization; part B covers nonhospital health services other than outpatient pharmacy; part C, also called Medicare Advantage, is defined below; and part D covers prescription drugs (Social Security Act: Title XVIII-Health Insurance for the Aged and Disabled, 1965).

Medicare Advantage: Medicare Advantage, also referred to as Medicare part C, is a health insurance program that provides Medicare covered benefits using private health plans. Medicare Advantage plans can cover either all of the services covered under Medicare parts A and B or all of the services covered under Medicare parts A, B, and D. Medicare Advantage plans come in many types including health maintenance organizations, preferred provider organizations and private fee-for-service plans (Centers for Medicare and Medicaid Services).

Medicare Special Needs Plans (SNPs): Authorized under the Medicare Modernization Act of 2003 and reauthorized subsequently, SNPs are Medicare Advantage plans designed to provide specialized care to Medicare beneficiaries who are either institutionalized, dually eligible for Medicare and Medicaid or who have certain severe or disabling chronic conditions. SNPs were first offered in 2006 and are currently authorized to operate through 2017 (Centers for Medicare and Medicaid Services).

Medicare Duals Special Needs Plans (DSNPs): DSNPs are Medicare Advantage Special Needs Plans that exclusively serve beneficiaries who are enrolled in both Medicare and Medicaid.[79]

Medicare Hospital Value Based Purchasing Program: Section 1886(o) of the Affordable Care Act created the Hospital Value-Based Purchasing Program. This program provides incentive payments to hospitals that meet specific quality standards. (Duals Special Needs Plans (DSNPs), 2014).

Medicare stars measurement system: This program rates health plans on a scale of one to five Medicare stars based on a series of metrics designed to judge health plan performance on keeping their members healthy, management of chronic conditions, the members' experience of care while in the plan, health plan customer service, access to care and health plan performance improvement. The stars program services two purposes. First, it is designed to assist consumers and regulators in determining the quality of care delivered to Medicare beneficiaries. Second, since 2012 it has been used as a component of the methodology used to compensate health plans (Centers for Medicare and Medicaid Services, 2013).

Physician Quality Reporting System (PQRS): PQRS is a quality measurement program in the Medicare program which judges the quality of care delivered by Medicare participating providers. Until 2015, PQRS was a voluntary program that provided incentives to eligible providers who reported quality information to CMS. Beginning in 2015, Medicare providers will be penalized if they fail to participate in PQRS (Centers for Medicare and Medicaid Services, 2014e).

Poverty: Poverty is a measure of an individual's income. Poverty is calculated by the U.S. Census Bureau based on a combination of income and household size (U. S. Census Bureau).

Social Determinants of Health: The CDC defines the social determinants of health as "The complex, integrated, and overlapping social structures and economic systems that are responsible for most health inequities. These social structures and economic systems include the social environment, physical environment, health services, and structural and societal factors. Social determinants of health are shaped by the distribution of money, power, and resources throughout local communities, nations, and the world" (Centers for Disease Control, 2014b).

Sociodemographic Factors: Factors that describe an individual's economic, social and demographic characteristics including economic attributes such as income and educational attainment, social attributes such as residence in a high crime area, an area with poor schools, or an area of nutritional deprivation (e.g., a food desert) and demographic factors, such as age, race, and ethnicity (National Quality Forum, 2014b).

Socioeconomic Status (SES): In developing an index of socioeconomic status the Agency for Healthcare Quality and Research defined SES as ". . . a multidimensional concept. Among the dimensions typically associated with SES are occupational status, educational achievement, income, poverty, and wealth" (Agency for Healthcare Quality and Research, 2012).

APPENDIX C: MEASURES BY STUDY BY TYPE

Author	Measure	Process/ administrative/p atient experience of care	Intermediate outcome	Outcome	Adjustments for existing health conditions	SES adjustments	2014 star measure no or yes (includes similar or successor)
Aranda	Readmission 6-9 months following an initial heart failure admission	No	No	Yes	Yes	No	Yes
Arbaje	Nonelective readmission within 6 months of discharge	No	No	Yes	Yes	No	No
ASPE	Hospital readmissions under the hospital readmissions reduction program	No	No	Yes	Yes	No	No
ASPE	Breast Cancer Screening	Yes	No	No	No	No	No
ASPE	Colorectal Cancer Screening	Yes	No	No	No	No	No
ASPE	Annual Flu Vaccine	Yes	No	No	No	No	Yes
ASPE	Improving or Maintaining Physical Health	No	No	Yes	Yes	Yes	Yes
ASPE	Improving or Maintaining Mental Health	No	No	Yes	Yes	Yes	Yes
ASPE	Monitoring Physical Activity	Yes	No	No	No	No	Yes
ASPE	Adult BMI Assessment	Yes	No	No	No	No	Yes
ASPE	Osteoporosis Management in Women who had fracture	Yes	No	No	No	No	Yes
ASPE	Diabetes – Eye Exam	Yes	No	No	No	No	No
ASPE	Diabetes – Kidney Disease Monitoring	Yes	No	No	No	No	No

Author	Measure	Process/ administrative/p atient experience of care	Intermediate outcome	Outcome	Adjustments for existing health conditions	SES adjustments	2014 star measure no or yes (includes similar or successor)
ASPE	Diabetes – Blood Sugar Controlled	No	Yes	No	No	No	No
ASPE	Controlling Blood Pressure	No	Yes	No	No	No	No
ASPE	Rheumatoid Arthritis Management	Yes	No	No	No	No	No
ASPE	Reducing the risk of falling	Yes	No	No	No	No	Yes
ASPE	Plan all-cause readmission	No	No	Yes	Yes	No	Yes
ASPE	High Risk Medication	No	Yes	No	No	No	Yes
ASPE	Medication Adherence for Diabetes Medication	No	Yes	No	No	No	Yes
ASPE	Medication Adherence for Hypertension	No	Yes	No	No	No	Yes
ASPE	Medication Adherence for Cholesterol	No	Yes	No	No	No	Yes
Ayanian (2013)	Breast Cancer Screening: Screening mammogram	Yes	No	No	No	No	No
Ayanian (2013)	Breast Cancer Screening: Diagnostic Mammogram	Yes	No	No	No	No	No
Ayanian (2014)	Cardiovascular disease: Blood-pressure control	No	Yes	No	No	No	No
Ayanian (2014)	Cardiovascular disease: LDL cholesterol testing and control	No	Yes	No	No	No	No
Ayanian (2014)	Diabetes care: LDL testing and control	No	Yes	No	No	No	No

Author	Measure	Process/ administrative/p atient experience of care	Intermediate outcome	Outcome	Adjustments for existing health conditions	SES adjustments	2014 star measure no or yes (includes similar or successor)
Barnett	Hospital readmissions under the hospital readmissions reduction program	No	No	Yes	Yes	No	No
Bernheim	Risk standardized readmission rates for AMI, Heart Failure and Pneumonia	No	No	Yes	Yes	No	Yes
Bird	Cardiovascular Care: Beta blockers after Myocardial Infarction	Yes	No	No	No	No	No
Bird	Cardiovascular Care: ACE inhibitors for patients with congestive heart failure	No	No	Yes	No	No	No
Bird	Diabetes Care: Blood Sugar screening	Yes	No	No	No	No	No
Bird	Diabetes Care -Eye exams	Yes	No	No	No	No	No
Bird	Diabetes Care – Kidney Disease Monitoring k	Yes	No	No	No	No	No
Bird	Cardiovascular Care: LDL-C control after AMI	No	Yes	No	No	No	No
Bird	Cardiovascular Care: BP control in hypertensives	No	Yes	No	No	No	No
Bird	Diabetes Care: Blood Sugar Controlled	No	Yes	No	No	No	No
Bird	Diabetes Care: LDL Control	No	Yes	No	No	No	No
Blum	30 day readmission for congestive heart failure	No	No	Yes	Yes	No	No

Author	Measure	Process/ administrative/p atient experience of care	Intermediate outcome	Outcome	Adjustments for existing health conditions	SES adjustments	2014 star measure no or yes (includes similar or successor)
Brennan	Annual receipt of appropriate blood tests for patients on persistent medications	Yes	No	No	No	No	No
Brennan	Antidepressant medication management	No	Yes	No	No	No	No
Brennan	Taking antidepressants continuously during 12-week acute phase of new depression episode	No	Yes	No	No	No	No
Brennan	Receipt of a disease-modifying Antirheuimatic drug for patients rheumatoid arthritis	Yes	No	No	No	No	No
Brennan	Cardiovascular Care: Persistence of beta-blockers for AMI	Yes	No	No	No	No	No
Brennan	Cardiovascular Disease: Beta blockers after heart attack	Yes	No	No	No	No	No
Brennan	Cardiovascular Care: LDL Screening	Yes	No	No	No	No	No
Brennan	Diabetes Care: eye exams	Yes	No	No	No	No	No
Brennan	Diabetes Care: blood sugar screening	Yes	No	No	No	No	Yes

Author	Measure	Process/ administrative/p atient experience of care	Intermediate outcome	Outcome	Adjustments for existing health conditions	SES adjustments	2014 star measure no or yes (includes similar or successor)
Brennan	Diabetes Care: blood sugar control	No	Yes	No	No	No	Yes
Brennan	Diabetes Care: nephropathy	Yes	No	No	No	No	No
Cahow	Breast Cancer Screening	Yes	No	No	No	No	No
Cahow	Colorectal Cancer Screening	Yes	No	No	No	No	No
Cahow	Cardiovascular Care: LDL Screening	Yes	No	No	No	No	No
Cahow	Glaucoma Testing	Yes	No	No	No	No	Yes
Cahow	Monitoring of Patients Taking Long-term Medications	Yes	No	No	No	No	No
Cahow	Annual Flu Vaccine	Yes	No	No	No	No	Yes
Cahow	Pneumonia Vaccine	Yes	No	No	No	No	Yes
Cahow	Improving or Maintaining Physical Health	No	No	Yes	Yes	Yes	Yes
Cahow	Improving or Maintaining Mental Health	No	No	Yes	Yes	Yes	Yes
Cahow	Osteoporosis Testing	Yes	No	No	No	No	Yes
Cahow	Monitoring Physical Activity	Yes	No	No	No	No	Yes

Author	Measure	Process/ administrative/p atient experience of care	Intermediate outcome	Outcome	Adjustments for existing health conditions	SES adjustments	2014 star measure no or yes (includes similar or successor)
Cahow	At Least One Primary Care Doctor Visit in the Last Year	Yes	No	No	No	No	Yes
Cahow	Osteoporosis Management	Yes	No	No	No	No	Yes
Cahow	Providing Certain Kinds of Care that Help Plan Members with Diabetes Stay Healthy	No	Yes	No	No	No	Yes
Cahow	Cardiovascular Care: BP control in hypertensives	No	Yes	No	No	No	Yes
Cahow	Receipt of a disease-modifying Antirheuimatic drug for patients rheumatoid arthritis	Yes	No	No	No	No	Yes
Cahow	Testing to Confirm Chronic Obstructive Pulmonary Disorder	Yes	No	No	No	No	No
Cahow	Improving Bladder Control	Yes	No	No	No	No	Yes
Cahow	Reducing the Risk of Falling	Yes	No	No	No	No	Yes
Cahow	Ease of Getting Needed Care and Seeing Specialists	Yes	No	No	Yes	Yes	Yes
Cahow	Doctors Who Communicate Well	Yes	No	No	No	No	Yes
Cahow	Getting Appointments and Care Quickly	Yes	No	No	Yes	Yes	Yes

Author	Measure	Process/ administrative/p atient experience of care	Intermediate outcome	Outcome	Adjustments for existing health conditions	SES adjustments	2014 star measure no or yes (includes similar or successor)
Cahow	Customer Service	Yes	No	No	Yes	Yes	Yes
Cahow	Overall Rating of Health Care Quality	Yes	No	No	Yes	Yes	Yes
Cahow	Overall Rating of Plan	Yes	No	No	Yes	Yes	Yes
Cahow	Complaints about the Health Plan	Yes	No	No	No	No	Yes
Cahow	Health Plan Makes Timely Decisions about Appeals	Yes	No	No	No	No	Yes
Cahow	Fairness of Health Plan's Denials to a Member's Appeal	Yes	No	No	No	No	Yes
Cahow	Members Choosing to Leave the Health Plan	Yes	No	No	No	No	Yes
Cahow	Seriousness of Problems Medicare Found During an Audit of the Health Plan	Yes	No	No	No	No	Yes
Cahow	Time on Hold When Customer Calls Health Plan	Yes	No	No	No	No	Yes
Cahow	Accuracy of Information Members Get When They Call the Health Plan	Yes	No	No	No	No	Yes
Cahow	Availability of TTY/TDD Services and of Foreign Language Interpretation When Members	Yes	No	No	No	No	Yes

Author	Measure	Process/ administrative/p atient experience of care	Intermediate outcome	Outcome	Adjustments for existing health conditions	SES adjustments	2014 star measure no or yes (includes similar or successor)
Carey	Risk standardized readmission rates for AMI, Heart Failure and Pneumonia under the Hospital readmissions reduction program	No	No	Yes	Yes	No	Yes
Cavillo-King	Readmission for Pneumonia and Heart Failure	No	No	Yes	Yes	No	Yes
Chou 2007a	Diabetes Care: Blood Sugar screening	Yes	No	No	No	No	Yes
Chou 2007a	Diabetes Care: Blood Sugar control	No	Yes	No	No	No	Yes
Chou 2007a	Cardiovascular Care: LDL control after AMI	No	Yes	No	No	No	Yes
Chou 2007a	Cardiovascular Care: LDL screening after AMI	Yes	No	No	No	No	Yes
Chou 2007a	Diabetes Care: nephropathy	Yes	No	No	No	No	Yes
Chou & 2007b	Diabetes Care: Blood Sugar screening	Yes	No	No	No	No	Yes
Chou & 2007b	Diabetes Care: Blood Sugar control	No	Yes	No	No	No	Yes
Chou & 2007b	Cardiovascular Care: LDL control after AMI	No	Yes	No	No	No	Yes
Chou & 2007b	Cardiovascular Care: LDL screening after AMI	Yes	No	No	No	No	Yes
Chou & 2007b	Diabetes Care: nephropathy	Yes	No	No	No	No	Yes

Author	Measure	Process/ administrative/p atient experience of care	Intermediate outcome	Outcome	Adjustments for existing health conditions	SES adjustments	2014 star measure no or yes (includes similar or successor)
Chou & 2007b	Diabetes Care: Eye exams	Yes	No	No	No	No	Yes
Couto	Medication Adherence for Cholesterol (Statins)	No	Yes	No	No	No	Yes
Couto	Medication Adherence for Oral Diabetes Medications	No	Yes	No	No	No	Yes
Couto	Medication Adherence for Hypertension	No	Yes	No	No	No	Yes
Damiani	Readmission for Heart Failure and Acute Myocardial Infarction	No	No	Yes	Yes	No	Yes
Eapen	30 days all cause readmissions among patients with heart failure	No	No	Yes	Yes	No	Yes
Figueroa	Hospital performance on the 3 hospital quality measurement programs under Medicare. Hospital readmissions under the hospital readmissions reduction program is the measure relevant to this study	No	No	Yes	Yes	No	Yes
Fischer	Hospital Readmissions	No	No	Yes	Yes	No	Yes
Fremont	Diabetes Care: Blood Sugar screening	Yes	No	No	No	No	Yes
Fremont	Diabetes Care: LDL Screening	Yes	No	No	No	No	Yes

Author	Measure	Process/ administrative/p atient experience of care	Intermediate outcome	Outcome	Adjustments for existing health conditions	SES adjustments	2014 star measure no or yes (includes similar or successor)
Fremont	Diabetes Care: Urine protein level screening	Yes	No	No	No	No	Yes
Fremont	Diabetes Care: Eye Exam	Yes	No	No	No	No	yes
Fremont	Cardiovascular Care: Beta blockers after Myocardial Infarction	Yes	No	No	No	No	Yes
Fremont	Cardiovascular Care: LDL-C screening after AMI	Yes	No	No	No	No	Yes
Fremont	Cardiovascular Care: LDL control after cardiac event	No	Yes	No	No	No	Yes
Fremont	Cardiovascular Care: BP control in hypertensives	No	Yes	No	No	No	Yes
Fremont	Diabetes Care: Blood Sugar control	No	Yes	No	No	No	Yes
Fremont	Diabetes Care: LDL control	No	Yes	No	No	No	Yes
Greysen	30 day all cause readmission	No	No	Yes	Yes	No	Yes

Author	Measure	Process/ administrative/p atient experience of care	Intermediate outcome	Outcome	Adjustments for existing health conditions	SES adjustments	2014 star measure no or yes (includes similar or successor)
Gu	30 Day Readmission rates among Medicare beneficiaries admitted with an index admission of: acute myocardial infarction, pneumonia, heart failure, chronic obstructive pulmonary disease (COPD), coronary artery bypass grafting (CABG), percutaneous transluminal cardio angioplasty (PTCA), and other vascular conditions	No	No	Yes	Yes	No	Yes
Harman	Improving or Maintaining Physical Health	No	No	Yes	Yes	Yes	Yes
Harman	Improving or Maintaining Mental Health	No	No	Yes	Yes	Yes	Yes
Harman	Diabetes Care: Blood Sugar testing	Yes	No	No	No	No	Yes
Harman	Diabetes Care: Eye exams	Yes	No	No	No	No	Yes
Harman	Diabetes Care: LDL screening	Yes	No	No	No	No	Yes
Harman	Diabetes Care: nephropathy	Yes	No	No	No	No	Yes
Harman	Diabetes Care: Blood Sugar control	No	Yes	No	No	No	Yes
Harman	Diabetes Care: LDL control	No	Yes	No	No	No	Yes

Author	Measure	Process/ administrative/p atient experience of care	Intermediate outcome	Outcome	Adjustments for existing health conditions	SES adjustments	2014 star measure no or yes (includes similar or successor)
Herrin	Risk standardized readmission rates for AMI, Heart Failure and Pneumonia	No	No	Yes	Yes	No	Yes
Holmes	Potentially inappropriate medication prescribing	Yes	No	No	No	No	Yes
Hu	30 day readmissions using the CMS all-cause unplanned readmission measure	No	No	Yes	Yes	No	Yes
Inovalon 2013	Rheumatoid Arthritis Management	Yes	No	No	No	No	Yes
Inovalon 2013	Breast Cancer Screening: Screening mammogram	Yes	No	No	No	No	Yes
Inovalon 2013	Glaucoma Testing	Yes	No	No	No	No	Yes
Inovalon 2013	Osteoporosis Management in Women who had a Fracture	Yes	No	No	No	No	Yes
Inovalon 2013	Plan All Cause Readmissions	No	No	Yes	Yes	No	Yes
Inovalon 2013	Diabetes Treatment	No	Yes	No	No	No	Yes
Inovalon 2013	High Risk Medication	No	Yes	No	No	No	Yes
Inovalon 2013	Medication Adherence for Cholesterol (Statins)	No	Yes	No	No	No	Yes
Inovalon 2013	Medication Adherence for Oral Diabetes Medications	No	Yes	No	No	No	Yes
Inovalon 2013	Rheumatoid Arthritis Management	Yes	No	No	No	No	Yes
Inovalon 2013	Medication Adherence for Hypertension	No	Yes	No	No	No	Yes

Author	Measure	Process/ administrative/p atient experience of care	Intermediate outcome	Outcome	Adjustments for existing health conditions	SES adjustments	2014 star measure no or yes (includes similar or successor)
Inovalon 2014	Rheumatoid Arthritis Management	Yes	No	No	No	No	Yes
Inovalon 2014	Diabetes Treatment	No	Yes	No	No	No	Yes
Inovalon 2014	High Risk Medication	No	Yes	No	No	No	Yes
Inovalon 2014	Medication Adherence for Cholesterol (Statins)	No	Yes	No	No	No	Yes
Inovalon 2014	Medication Adherence for Diabetes Medications	No	Yes	No	No	No	Yes
Inovalon 2014	Medication Adherence for Hypertension (RAS Antagonists)	No	Yes	No	No	No	Yes
Inovalon 2014	Osteoporosis Management in Women who had a Fracture	Yes	No	No	No	No	Yes
Inovalon 2014	Plan All-Cause Readmissions	No	No	Yes	Yes	No	Yes
Inovalon 2015	Plan All-Cause Readmissions	No	No	Yes	Yes	No	Yes
Inovalon 2015	Medication Adherence for Hypertension	No	Yes	No	No	No	Yes
Inovalon 2015	Medication Adherence for Diabetes	No	Yes	No	No	No	Yes
Inovalon 2015	Medication Adherence for Cholesterol	No	Yes	No	No	No	Yes
Inovalon 2015	Access to Primary Care Doctor Visits	Yes	No	No	No	No	Yes
Inovalon 2015	Antidepressant Medication Management	Yes	No	No	No	No	Yes

Author	Measure	Process/ administrative/p atient experience of care	Intermediate outcome	Outcome	Adjustments for existing health conditions	SES adjustments	2014 star measure no or yes (includes similar or successor)
Inovalon 2015	Rheumatoid Arthritis Management	Yes	No	No	No	No	Yes
Inovalon 2015	Osteoporosis Management in Women who had a Fracture	Yes	No	No	No	No	Yes
Inovalon 2015	High-Risk Medication	No	Yes	No	No	No	Yes
Inovalon 2015	Diabetes Treatment	No	Yes	No	No	No	Yes
Inovalon 2015	Breast Cancer Screening	Yes	No	No	No	No	Yes
Inovalon 2015`	Drug-Drug Interaction	No	No	Yes	No	No	Yes
Inovalon 2015`	Engagement of Alcohol or Other Drug Dependence Treatment	No	No	Yes	No	No	Yes
Inovalon 2015`	Initiation of Alcohol or Other Drug Dependence Treatment	Yes	No	No	No	No	Yes
Inovalon 2015`	Continuous Beta-Blocker Treatment	No	Yes	No	No	No	Yes
Inovalon 2015`	Pharmacotherapy Management of COPD Exacerbation-Bronchodilator	Yes	No	No	No	No	Yes
Inovalon 2015`	Pharmacotherapy Management of COPD Exacerbation-Systemic Corticosteroid	Yes	No	No	No	No	Yes
Inovalon 2015	Testing to Confirm COPD	Yes	No	No	No	No	Yes
Jung	Reducing risk of falling	Yes	No	No	Yes	Yes, for education	Yes

Author	Measure	Process/ administrative/p Patient experience of care	Intermediate outcome	Outcome	Adjustments for existing health conditions	SES adjustments	2014 star measure no or yes (includes similar or successor)
Jung	Improving bladder control	Yes	No	No	Yes	Yes, for education	Yes
Jung	Monitoring physical activity	Yes	No	No	Yes	Yes, for education	Yes
Joynt 2011	Risk adjusted 30 day readmissions rates among patients with AMI, CHF or pneumonia	No	No	Yes	Yes	No	Yes
Joynt 2013	Risk standardized readmissions under the HRRP	No	No	Yes	Yes	No	Yes
Kahn	Hospital performance on the 3 hospital quality measurement programs under Medicare. Hospital readmissions under the hospital readmissions reduction program is the measure relevant to this study	No	No	Yes	Yes	No	Yes
Kind	30-day rehospitalizations for patients discharged with congestive heart failure, pneumonia, or acute myocardial infarction	No	No	Yes	Yes	No	Yes

Author	Measure	Process/ administrative/p atient experience of care	Intermediate outcome	Outcome	Adjustments for existing health conditions	SES adjustments	2014 star measure no or yes (includes similar or successor)
Krumholz 1997	Hospital readmission within 6 months of discharge and readmission or death within 6 months of discharge among patients with an index admission of congestive heart failure	No	No	Yes	Yes	No	Yes
Krumholz 2000	All-cause readmission within 6 months after discharge among patients with a principal discharge diagnosis of heart failure	No	No	Yes	Yes	No	Yes
Lindenaur	Risk of death within 30 days of admission or rehospitalization for any cause within 30 days of discharge among patients acute myocardial infarction, heart failure, or pneumonia	No	No	Yes	Yes	No	Yes
Mahmoudi	Diabetic foot exam	Yes	No	No	No	No	Yes
Mahmoudi	Cholesterol check for diabetics	Yes	No	No	No	No	Yes
Mahmoudi	Flu vaccine	Yes	No	No	No	No	Yes
Mahmoudi	Eye exam for diabetics	Yes	No	No	No	No	Yes
McBean	Diabetes Care: Blood Sugar control	No	Yes	No	No	No	Yes

Author	Measure	Process/ administrative/p atient experience of care	Intermediate outcome	Outcome	Adjustments for existing health conditions	SES adjustments	2014 star measure no or yes (includes similar or successor)
McHugh	30-day all cause readmissions for Medicare traditional patients discharged from a short-term acute care hospital with a principal diagnosis of heart failure, AMI, or pneumonia	No	No	Yes	Yes	No	Yes
Nagasako	All cause readmissions among patients with an index admission of myocardial infarction, heart failure or pneumonia	No	No	Yes	Yes	No	Yes
Priest	The percentage of patients with asthma who had at least 4 prescription fills for short-acting beta-agonist rescue medication	Yes	No	No	No	No	Yes
Priest	The percentages of patients with a level II exacerbation or level III exacerbation of COPD	No	No	Yes	No	No	Yes
Priest	Coronary Artery Disease -- fills, persistence and compliance among patients who filled a	No	Yes	No	No	No	Yes
Priest	Diabetes Care: Blood Sugar screening	Yes	No	No	No	No	Yes
Priest	Diabetes Care: LDL screening	Yes	No	No	No	No	Yes

Author	Measure	Process/ administrative/p atient experience of care	Intermediate outcome	Outcome	Adjustments for existing health conditions	SES adjustments	2014 star measure no or yes (includes similar or successor)
Priest	Diabetes Care: Eye Exam	Yes	No	No	No	No	Yes
Priest	Heart Failure - fills, persistence and compliance among patients who filled a prescription for ‘‘any acceptable therapy,’’ defined according to disease-specific national treatment guidelines	No	Yes	No	No	No	Yes
Priest	Hyperlipidemia - - fills, persistence and compliance among patients who filled a prescription for ‘‘any acceptable therapy,’’ defined according to disease-specific national treatment guidelines	No	Yes	No	No	No	Yes
Priest	Hypertension - - fills, persistence and compliance among patients who filled a prescription for ‘‘any acceptable therapy,’’ defined according to disease-specific national treatment guidelines	No	Yes	No	No	No	Yes
Priest	The percentage of new episode depression patients with any antidepressant medication fill within 90 days of diagnosis.	Yes	No	No	No	No	Yes

Author	Measure	Process/ administrative/p atient experience of care	Intermediate outcome	Outcome	Adjustments for existing health conditions	SES adjustments	2014 star measure no or yes (includes similar or successor)
Qato	Receipt of high risk medications	No	Yes	No	No	No	Yes
Rathore & Foody	Readmission within one year of discharge and mortality within one year of admission among patients with an index admission of heart failure	No	No	Yes	Yes	No	Yes
Rathore & Masoudi	Readmission within one year of discharge and mortality within 30 days or one year of admission among patients with an index admission of heart failure	No	No	Yes	Yes	No	Yes
Rodriguez	Readmission within 30 days of discharge among patients with an index admission of heart failure and acute myocardial infarction	No	No	Yes	Yes	No	Yes
Schmajuk	Receipt of a disease-modifying Antirheuimatic drug for patients rheumatoid arthritis	Yes	No	No	No	No	Yes
Schneider	Breast Cancer Screening: Screening mammogram	Yes	No	No	No	No	Yes

Author	Measure	Process/ administrative/patient experience of care	Intermediate outcome	Outcome	Adjustments for existing health conditions	SES adjustments	2014 star measure no or yes (includes similar or successor)
Schneider	Diabetes Care: Eye Exams	Yes	No	No	No	No	Yes
Schneider	Cardiovascular Care: Beta blockers after Myocardial Infarction	Yes	No	No	No	No	Yes
Schneider	Follow up after hospitalization for mental illness	Yes	No	No	No	No	Yes
Sheingold	Risk standardized readmissions under the HRRP	No	No	Yes	Yes	No	Yes
Singh	30 day readmission rates for medical discharges	No	No	Yes	Yes	No	Yes
Tsai	30 day all-cause readmission among patients undergoing CABG, pulmonary lobectomy, endovascular abdominal aortic aneurism repair, open abdominal aortic aneurism repair, colectomy, and hip replacement	No	No	Yes	Yes	No	Yes
Trivedi 2006	Diabetes Care: Blood Sugar control	Yes	No	No	No	No	Yes
Trivedi 2006	Diabetes Care: LDL screening	Yes	No	No	No	No	Yes
Trivedi 2006	Cardiovascular Care: BP control in hypertensives	No	yes	No	No	No	Yes

Author	Measure	Process/ administrative/patient experience of care	Intermediate outcome	Outcome	Adjustments for existing health conditions	SES adjustments	2014 star measure no or yes (includes similar or successor)
Trivedi 2006	Cardiovascular Disease: LDL Screening	Yes	No	No	No	No	Yes
Trivedi 2005	Breast Cancer Screening: Screening Mammogram	Yes	No	No	No	No	Yes
Trivedi 2005	Diabetes Care: Eye Exam	Yes	No	No	No	No	Yes
Trivedi 2005	Diabetes Care: Blood Sugar screening	Yes	No	No	No	No	Yes
Trivedi 2005	Diabetes Care: Blood Sugar control	No	Yes	No	No	No	Yes
Trivedi 2005	Diabetes Care: LDL screening	Yes	No	No	No	No	Yes
Trivedi 2005	Diabetes Care: LDL control	No	Yes	No	No	No	Yes
Trivedi 2005	Cardiovascular Care: Beta blockers after Myocardial Infarction	Yes	No	No	No	No	Yes
Trivedi 2005	Cardiovascular disease: LDL Screening after cardiac event	Yes	No	No	No	No	Yes
Trivedi 2005	Cardiovascular Care: LDL control after cardiac event	No	Yes	No	No	No	Yes
Virnig 2002	Breast Cancer Screening: Screening mammogram	Yes	No	No	No	No	Yes
Virnig 2002	Cardiovascular Care: LDL control after cardiac event	No	Yes	No	No	No	Yes
Virnig 2002	Diabetes Care	Yes	No	No	No	No	Yes
Virnig 2002	Cardiovascular Care: BP control in hypertensives	No	Yes	No	No	No	Yes

Author	Measure	Process/ administrative/patient experience of care	Intermediate outcome	Outcome	Adjustments for existing health conditions	SES adjustments	2014 star measure no or yes (includes similar or successor)
Virnig 2007	Breast Cancer Screening: Screening mammogram	Yes	No	No	No	No	Yes
Virnig 2007	Diabetes Care	No	Yes	No	No	No	Yes
Virnig 2007	Cardiovascular Care: Beta blockers after Myocardial Infarction	Yes	No	No	No	No	Yes
Virnig 2007	Cardiovascular Care: BP control in hypertensives	No	Yes	No	No	No	Yes
Virnig 2007	Cardiovascular Care: LDL control after cardiac event	No	Yes	No	No	No	Yes
Virnig 2007	Follow up after hospitalization for mental illness	Yes	No	No	No	No	Yes
Virnig 2004	Follow up after hospitalization for mental illness	Yes	No	No	No	No	Yes
Virnig 2004	Average length of stay for inpatient mental health treatment	Yes	No	No	No	No	Yes
Virnig 2004	Antidepressant medication management	Yes	No	No	No	No	Yes
Young	Medication Adherence for Cholesterol (Statins)	No	Yes	No	No	No	Yes
Young	Medication Adherence for Oral Diabetes Medications	No	Yes	No	No	No	Yes
Young	Medication Adherence for Hypertension	No	Yes	No	No	No	Yes

APPENDIX D: SUMMARY OF INCLUDED ARTICLES

Author	Year	Study design	Population	Data source	Dependent variable/measure	Analytic methods	Findings	Limitations
Aranda	2009	Retrospective cohort	28919 Medicare patients discharged during 2003 with an ICD-9 code of heart failure who experience a readmission in the 2 quarters after the initial admission	Medicare standard analytical file limited data set for the years 2002-2004	Readmission within 6-9 months following an initial heart failure admission	Multivariate logistic regression was used to identify factors associated with readmission for any cause within the 6-9 months of the initial hospitalization for heart failure. Adjusters included age, sex, race, US Census region, length of hospital stay, comorbidities, and device implant during initial hospitalization, previous history of hospitalization in the preceding year.	Rehospitalization for patients with heart failure remains a significant risk. The risk is slightly higher for African Americans than for Caucasians (OR 1.05) and substantially higher for other nonwhite populations (OR 1.17)	Data provided comorbidity information but did not provide sufficient data for detailed adjustment analysis. The data did not provide an exact date of readmission requiring assumption.

Arbaje	2008	Retrospective cohort	1,351 community-dwelling Medicare beneficiaries admitted to hospitals, discharged home and surviving at least one year after discharge	Medicare current beneficiary survey and Medicare claims data for the years 2001 and 2002	Readmission within 6 months	Bivariate logistic regression followed by multivariate regression and sensitivity testing. The multivariate analysis adjusted for demographics, health and functional status	After adjustment, readmitted persons were more likely to live alone, lacking in self-management skills, have unmet functional (IADL) needs, Readmitted persons were also more likely to have limited education. Low income did not demonstrate a statistically significant association with readmission.	Participants baseline functional and SES characteristics could have changed over the study period, the data set left out individuals who died over the course of the study period, The SES results should be interpreted cautiously due to lack of statistical power

ASPE	2016	Retrospective cohort analysis	15,282,565 Medicare beneficiaries participating in MA in 2014; 505 MA contracts subject to the 2015 stars methodology measuring performance in 2014 and Medicare fee-for-service (FFS) claims from fiscal years (FY) 2011-2013 (October 2010 –September 2013) Analyses included all acute care hospitals paid under the Inpatient Prospective Payment System (IPPS).	Medicare claims data for hospitals paid in the IPPS program and beneficiary and contract-level data for all MA and MA-PD contracts eligible for Star Rating on all measures included in the MA Star Rating Program from program measurement year 2014 (used for the 2016 Star Ratings and 2017 Quality Bonus Payments)	Readmission as calculated for the Hospital Readmission Reduction program, the 45 Part C & D measures used to rate MA-PD contracts in 2016	Regression analyses using beneficiary/patientl evel data and plan/hospital level data with social risk factors as defined by NAM independent variables and performance on the measures in the HRRP and MA Star Rating Programs as the outcomes of interest.	For hospitals dual eligibles had significantly greater odds of readmission without a hospital effect, risk standardization reduced but didn't eliminate differences between safety-net and non-safety-net hospitals but differences in penalties were small under the current program. For health plans: dual eligibles, LIS-eligibles, black, rural, beneficiaries in low-income neighborhoods and beneficiaries with disabilities fared more poorly. The differences were small to moderate in size and largely drive by patient rather than plan factors. Hispanics did better on most measures. Plan contracts with higher proportions of members with social risk factors fared more poorly although a small number of high dual/LIS contracts performed well	For hospitals: data limitations impact the ability to identify all relevant social risk factors; the risk standardization technique used in the HRRP has limitiations, and examining past performance may not predict future performance. For health plans: the data were from 2014 and may not represent future performance; disability was limited to reason for entitlement due to data limitations; and contract level data collection limits plan level analysis.

Ayanian	2013	Retrospective cohort	495,836 women in Medicare HMOs, 81,480 women in Medicare PPOs between the ages of 65 and 69 and women of the same ages from the Medicare FFS data file	2009 Medicare beneficiary summary file data	Screening and Diagnostic mammogram HEDIS measures	By cohort (HMO or PPO) they conducted a matched analysis based on the distribution of the minority beneficiaries matched by age, dual status and by region (county or state). They calculated rates of mammography for each minority group relative to matched white women within PPOs and HMOs to traditional Medicare. They used the HEDIS specifications for the measure which included inclusion and exclusion criteria but do not adjust for underlying health status.	For all groups, before adjustment, mammography rates were highest in HMO, then PPO, then traditional. Relative to matched white women, mammography rates were statistically significantly higher for black, Hispanic and Asian women in HMOs. There were substantially greater disparities in traditional Medicare than in HMOs for black, Hispanic and Asian women relative to matched white women.	The results could reflect matching by county rather than by state; the comparison could be impacted by differences between plan HEDIS reports and Medicare FFS claims data; limitations of the Hispanic and Asian Pacific identifiers that use surname data.

Ayanian	2014	Retrospective cohort	Medicare HMO enrollees in 2011: 94,171 with hypertension 112,039 with cardiovascular disease, 105,848 with diabetes	Medicare Beneficiary Summary File comparing Medicare-Advantage HMO enrolled beneficiaries in 2006 and 2011 on three measures of quality	HEDIS measures of Blood Pressure Control; Blood Sugar Control; Cholesterol Control	Age and sex adjusted proportions of enrollees with controlled blood pressure, blood sugar and cholesterol consistent with the specifications of the selected HEDIS measures and weighted to reflect the distribution of those conditions according to age, sex, race or ethnicity on the basis of disease prevalence within each stratum. Race was standardized to estimate age and sex adjusted disparities and stratified by geographic region.	Disparities reduced between 2006 and 2011. In 2011 black enrollees were substantially less likely than whites to have adequate control on all three measures in both years and in all regions, except the west, and then only in a single, large health plan. Hispanic enrollees were slightly less likely than whites to have adequate control in all 3 measures. Asian and Pacific Islanders were more likely than whites to have adequate blood pressure and cholesterol control and equally likely to have blood sugar control. Between plan variation accounted for 39%-59% of disparities.	Because they used HEDIS data, plans with integrated medical records may have a more complete ascertainment of risk factor measures; better control of intermediate outcomes for blacks in the west may arise from unmeasured factors such as socioeconomic or health status, the researchers lacked data on provider practice behaviors that may have contributed to these changes, the researchers lacked data on clinical complications

Barnett	2015	Retrospective cohort	333, 158 Medicare beneficiaries	Health and Retirement Survey (HRS) respondents eligible for Medicare from 2000-2010 and matched with Medicare claims from 2000-2012 excluding patients who were not hospitalized after completion of the survey	30-day readmission for MI, CAP and CHF	Fitted multivariate regression predicting 30 day readmission for the given conditions as a function of the independent variable: % SSI, Prescription drug coverage, smoking status, drinks daily, CCW conditions, HCC score, CES quartile, cognition score quartile, self-rated health, proxy respondent, difficulties with ADLs, difficulties with IADLs, difficulties with activities requiring mobility, difficulties with activities requiring agility, household residents, living children, living siblings, friends nearby, frequency of contact with friends.	Patient characteristics not included in Medicare's current risk-adjustment methods for assessing hospital readmissions explained 48% of the difference in readmission risk between high and low readmission hospitals.	Because it was limited to HRS respondents it could not evaluate the impact on individual hospitals. The size of the HRS study limited the precision with which they could estimate differences in the probability of readmission between participants admitted to hospitals with high and low readmission rates.

Bernheim	2016	Retrospective cohort	526,272 AMI admissions to 4,432 hospitals, 1,278,296 HF admissions to 4,733 hospitals and 1,099,230 pneumonia admissions to 4,773 hospitals	Medicare claims data from the Medicare inpatient and outpatient analytic files	Risk standardized 30-day readmission for MI, CAP and CHF	Comparison of risk standardized readmissions among hospitals serving high and low proportions of low SES patients and a risk-standardized readmission rate after adjustment for patient SES.	High and low-SES serving hospitals have similar rates of risk standardized readmissions and risk adjustment for SES changed results by 1% resulting in 3-4% fewer low-SES serving hospitals being subject to penalty under the HRRP	.Use of zipcode level median income as a proxy for patient SES. The authors sought to reduce these effects by calculating the results using dual eligible status and a composite measure of readmission and the results were unchanged.

Bird	2007	Retrospective cohort	200,000 Medicare and 2.1 million commercial enrollees in four geographic regions, all from the same insurer.	Data provided by a single insurer for nine Medicare and ten commercial health plans	Ten HEDIS quality Measures (see Appendix C for specific measures)	Chi square tests were to compare unadjusted performance rates by gender by measure. Seven measures analyzed using claims data, four using HEDIS data. Analysis used NCQA HEDIS specifications which specify inclusion and exclusion criteria, but do not control for health status or co-morbidities. Multivariate logistic regression was used to adjust for age, race/ethnicity, and SES. Race/ethnicity and SES were identified using geocoding.	Adjusting for covariates, there were significant gender differences on 5 of 11 measures with four favoring men. The largest disparity was LDL-C among diabetics. Gender differences were common and sometimes substantial. Covariate adjustment eliminated gender differences for lipid profile check among diabetic Medicare enrollees but two gender differences became significant after co-variate adjustment.	The authors could not identify the underlying causes of the disparities. Race/ethnicity and SES were geocoded based on ZIP code data rather than individual beneficiary attributes. The data are older.

Blum	2014	Retrospective cohort	Medicare traditional beneficiaries aged 65+ hospitalized with a primary discharge diagnosis of congestive heart failure between 12/1/06 and 12/1/09	Medicare traditional claims data and Medicare Beneficiary Annual Summary files	30 day readmission for congestive heart failure	Phase 1: Estimation of hospital level risk-standardized readmission rates adjusting for age, sex and comorbid conditions. Phase 2: examined the impact of the inclusion of the AHRQ SES index score on the performance on minority-serving hospitals	Higher SES score were associated with a lower odds ratio of readmission. Nonetheless, adjusting for SES moved the results for only one study hospital. There were a small number of hospitals overall who were above and below the mean.	The study is limited to readmissions for heart failure and is limited to experience in New York City. The study is limited to inpatient data only; not ambulatory care experience. The community-level SES may not be an appropriate indicator of patient-level socioeconomic status.
Brennan	2010	Retrospective cohort	Medicare enrollees in traditional Medicare and Medicare health plans	Generating Medicare Physician Quality Performance Measure Results (GEM) project	11 quality measures (see Appendix C)	Claims data were used to identify a subset of enrollees for whom a treatment or screening was clinically recommended following HEDIS specifications. For the traditional data, measures were aggregated at the state, national and ZIP code levels. For Medicare Advantage data they summed the numerators and denominators across plans to produce an accurate national picture of the quality provided to an average beneficiary.	Medicare Advantage plans scores substantially better on 8 measures, slightly better on 2 measures and worse on 1 measure. The results were adjustment for SES characteristics. The impact of adjustments for SES characteristics were too small to explain the performance differences.	Measures of quality applied to traditional Medicare and Medicare Advantage are inconsistent; population differences were accounted for by matching of cohorts but could only truly be addressed via randomization

Cahow	2010	Retrospective cohort	352 DSNP plans	352 DSNP contracts that reported a 2010 summary star score and enrollment data from the Dec. 2008 MA monthly enrollment contract file	Medicare stars measures and summary scores: 11 HEDIS measures 6 CAHPS measures, 8 operational measures (see Appendix C)	Regression estimation of the impact of each independent variable on each measure	Enrollment in a DSNP plan is negatively correlated with health plan summary Medicare stars score/quality rating.	Dual eligible status is not a perfect proxy for SES; ecological fallacy may be present when examining data at the plan level; research was sponsored by a health plan trade organization and conducted by a consulting group whose clients include health plans.

Calvillo-King	2012	Systematic review	72 articles relating to millions of hospitalizations of which 15 used Medicare data sets	Ovid, PubMed and Psychinfo		Systematic review of the literature	The authors divided social factors into higher and lower level. The lower level factors were age, gender and race. Higher level factors were income, education and employment. Most of the articles addressed lower level factors. Articles were inconsistent in their study of higher level factors. Generally, for community acquired pneumonia older age and nonwhite race were associated with worse outcomes and for heart failure nonwhite race was associated with higher readmissions but lower mortality. For both conditions the higher level factors were significantly but inconsistently associated with readmission and mortality.	Data inconsistent so that no formal synthesis was possible.

Carey	2016	Retrospective cohort	Hospital level performance data	Medicare Hospital Compare website and the Medicare Healthcare Cost Report Information System (HCRIS)	30-day readmission rates as calculated for the HRRP for 2013 to 2016	T-tests to compare safety-net hospitals to other hospitals and regression analysis to compare percentage point reductions in readmissions in safety net hospitals to other hospitals	Risk adjusted readmissions were higher for all 3 conditions in safety-net hospitals than in other hospitals in both years but safety-net hospitals improved more than other hospitals. However, safety-net hospitals did not improve as fast as non-safety net hospitals with similar levels of readmission in year 2013.	The study examines two points in time only. Adjustments were limited to hospital size, resident to bed ratio, percentage of patients with Medicare and occupancy rates. Variables not accounted for could explain some or all of the results.
Chou	2007a	Retrospective cohort	Member-level HEDIS data for 96,055 members from 148 Medicare Managed Care Plans in 2004	CMS enrollment files matched with US Census Data	6 measures of diabetes care (see appendix C for specific measures)	Linear regression was modeled (at a 95% CI) for each HEDIS measure as a function of race, controlling for SES characteristics, enrollment in a plan with more than 20% minority membership and region of residence at the first level and plan size at the second level.	Women were more likely than men to receive screenings but less likely to have cholesterol control; racial disparities favored white patients over black on 5 of 6 measures, enrollees in managed care plans where blacks constituted more than 20% of the membership tended to have a lower likelihood of meeting 4 measures	The study data set doesn't include individual demographic data including marital status, health status or utilization patterns, the study only compared white and African American beneficiaries because of data limitations related to other ethnic group identification

Chou	2007b	Retrospective cohort	Commercial and Medicare Health Plan HEDIS results. For Medicare the data set included individual-level data for participants in 148 health plans	HEDIS data submitted by plans, Medicare enrollment file, census data by ZIP code	5 measures of cardiovascular care quality. See appendix C for specific measures	Tested the viability of gender stratified measurement. Identified the presence of gender disparities using paired T-tests and Bonferroni adjustments. Scored the magnitude of gender disparities by computing a disparity score for each measure defined as the rate for men minus the rate for women	Gender differences for Medicare Advantage plans favored men and were not linked to health plan performance or region.	The article presents only unadjusted data at the health plan level, the study did not control for age, the lack of provider and patient-level data on utilization made it impossible to differentiate between clinical practice and patient adherence in order to explain the source of the observed disparities.

Couto	2014	Retrospective cohort	379,533 Medicare part D beneficiaries	Pharmacy claims data from a large commercial pharmacy benefit manager and a large Medicare part D prescription drug plan	Adherence to medication for diabetes, hypertension and hyperlipidemia	6 separate multiple logistic regressions were executed to test for adherence differences by census region, age, gender and socio economic status defined as median household income and LIS status	Adherence differed by region with New England being the most adherent region and the West South Central region being the least adherent when controlling for age, gender and LIS status. Beneficiaries younger than 65 and females were significantly less likely to be adherent. Beneficiaries who received LIS were significantly less likely than those who didn't to be adherent.	The study did not control for comorbidities as medical claims were not available. The LIS identifier did not distinguish between dual and nondual beneficiaries. Median income was derived using census data to the five-digit ZIP code, rather than individual-level data. Geography is likely a proxy for health literacy, care access, burden of disease, race and other variables but the extent of the relationship was not studied. The data used were from a single, large health plan.

Damiani	2015	Systematic review	11 articles, all cohort studies, 10 from the US, 6 using Medicare data, 7 of which are included in this review representing 6,104,859 patients	Medline	Studies measuring the association between risk for readmission and one SES factor, marital status, and income among patients 65+ with HF and AMI	Systematic review of the literature	For the short term outcome (30-90 days) for HF and AMI the factor race/ethnicity and unmarried status were positively related to readmission, educational attainment had no effect. Income was inconclusive but promising. Hispanic and Black people were at increased risk compared to white people. For the long term outcome (6 months- 1 year) the SES factor had an inconclusive but cumulative effect, insufficient evidence was found for SES and social network	One database, differential definitions of socioeconomic factors, the variability of the studies, inclusion of only older populations with HF and AMI limits generalizability.

Eapen	2015	Retrospective Cohort	48,338 patients from 197 hospitals	Get with the guidelines clinical registry data from 1/1/05-12/30/11 and 2012 Area health resource files	All Cause Rehospitalization within 30 days of discharge	Multivariate regression	County-level SES data are modestly associated with 30-day readmission outcomes among Medicare beneficiaries hospitalized with HF but adding county-level SES data (on top of patient characteristic data) does not improve risk adjustment models or change hospital rankings. The proportion of persons with at least a high school diploma was associated with lower odds of 30-day rehospitalization. County-level SES data adjusted away the association between black race or Hispanic ethnicity and 30-day readmission. SES at least partially accounts for the relationship of race and ethnicity with early-post discharge outcomes for patients with HF.	The study was limited to Medicare beneficiaries enrolled in Get with the Guidelines, income is an unreliable variable in a community of individuals who may be retired, the utility of county-level SES data may have been increased if it were more granular or the population had been observed over a longer period of time.

Figueroa	2016	Retrospective Cohort	3052 hospitals	CMS HRRP, VBP and HAC penalty reporting files, AHA annual hospital survey, CMS impact file	Penalty under the HRRP, VBP, or HAC programs	Multinomial logistic regression to calculate the odd of receiving high, medium of low penalties	In 2015 large hospitals, major teaching and high DSH hospitals were far more likely to receive penalties under the Medicare HRRP, VBP, and HAC programs. High DSH hospitals were twice as likely to be in the most penalized group	Hospital-level analysis, single year data, use of high DSH as a proxy for safety net.
Fischer	2014	Systematic review	102 articles, number, age or location of effected patients unstated	Embase, Medline, OvidSP, Web of Science, Cochrane, PubMed	Studies focused on the methodological aspects of readmission rates as a quality indicator for hospital care.	Systematic review of the literature	The likelihood of readmission is effected by the quality of care and the characteristics of the patient, the sickest and the poorest are at highest risk of readmission but the measure which often uses administrative data excluding detailed clinical data. Current research provides limited guidance on which case mix variables should be included. Other challenges to the measure: clinical setting, indicator definition, effect of competing outcomes, data reliability	Not exclusive to Medicare, seniors or the U.S.
Fremont	2005	Retrospective cohort	9 Medicare+ Choice and 10 commercial health plans including	Plan-level HEDIS process of care measure and intermediate outcomes	Process: Diabetics annually checked for Blood Sugar, LDL and urine protein levels and annual eye exam. Beta blocker	X^2 tests were used to compare the % of eligible patients in each racial/ethnic and SES group that met each process	Racial and SES disparities were present for the majority of process measures. Results were essentially the same for individual and geocoded	Race/ethnicity data were geocoded rather than individually identified. However, in validation, the

			195,116 Medicare enrollees in 4 regional	data, Census block data and CMS individual-level race data	prescription post-MI, LDL check in patients after cardiac event; Intermediate outcome: adequate LDL control after a cardiac event, blood pressure control in hypertensives, Blood Sugar and LDL control in diabetics	measure. Multivariate logistic regression was used to compare the adjusted probability meeting the quality measure in each subgroup by plan type. Tests were repeated at the plan and individual levels for the diabetes measures. Adjusted and unadjusted racial/ethnic and SES disparities were examined for intermediate outcome measures.	performance. Additional adjustments for sociodemographic factors reduced but did not eliminate the size of the disparities based on gender and age). Significant racial disparities existed for all but one intermediate outcome measure and SES disparities were present for all four. On several measures race and SES exert independent effects.	results were similar between geocoded and individual data. Geocoding allowed only a comparison of black and other races.

Greysen	2015	Retrospective cohort	7854 community dwelling seniors representing 22,289 Medicare hospitalization from 2000 to 2010 admissions not patients were the unit of analysis	The national health and retirement study (HRS) and Medicare claims data	Functional Impairment	Logistic regression with robust variance estimation to adjust for clustering of admissions within individuals. They additionally performed a sub-analysis restricted to MI, CAP and HF.	Admissions with a readmission within 30 days were substantially higher for patients with a nonwhite race/ethnicity, lower annual income, lower net wealth, less than a high school diploma, fair or poor self-rated care, a higher Elixhauser comorbidity score and a previous hospitalization within 1 year of the index admission. In the multivariate analysis they found a progressive increase in the risk adjusted risk of readmission as the degree of functional impairment increased. A similar trend was found when limiting the readmissions to MI, CAP, and HF	Given the manner in which the HRS is conducted, measurement of functional impairment and hospitalization were not uniform among survey participants, the study is limited to data before 2010, the authors did not use the same readmission adjustment procedures used by CMS in calculating readmission rates including SES factors which may be over adjusted the readmission rates and therefore be conservative.
Gu	2014	Retrospective cohort	Readmissions among patients with the following index admissions: 142122 index admissions	100% Medicare traditional inpatient claims data for 2009 to identify short-term acute care hospital	Risk-standardized readmission rates	Regression analysis and projections. Medicare cost reports were used to identify hospital population characteristics:	Patient dual eligible status and hospital dual eligible share have a positive impact on risk-adjusted hospital readmission rates. High dual hospitals are likely to have excess readmissions when compared to low dual hospitals. Risk standardized readmission rates for heart attack, pneumonia	CMS uses 3 years of data to calculate readmission measures while this study used only one year of data; the study uses only inpatient claims;

			for acute myocardial infarction; 264815 index admissions for pneumonia; 350, 590 index admissions for heart failure	admissions for 7 conditions, applied the inclusion and exclusion criteria for the Medicare HRRP measure.		% duals, profit margin and characteristics; could not, based on data accessible, use the HCC model so instead adjusted for comorbidities using the Elixhauser model from AHRQ	and heart failure were higher for dual eligibles even after controlling for age, gender and comorbidity. Dual eligibles were more likely to be female and African American.	Dual status is not a perfect proxy for examining the relationship between SES and readmissions. Authors are consultants and staff of the American Association of Medical Colleges.
Harman	2010	Retrospective cohort	8184 Medicare plan enrollees; noninstitutionalized, nonproxy respondents aged 65+	Medicare HOS 2001-2003 and Medicare HEDIS 2002	2 year changes in enrollee physical and mental health based on 6 plan-level performance measures corresponding to diabetes process and intermediate outcome measures	Hierarchical linear models were used to estimate the relationship between plan HEDIS performance on diabetes process and outcome measures and 2-year changes in enrollee Health Outcome Survey (HOS) physical and mental health scores.	Health plan process of care composite scores were not associated with improvements in the individual physical component score (PCS) but intermediate outcome scores were significantly associated with changes in PCS score. The process of care composite and intermediate outcome composite were both significantly associated with changes in the mental component score (MCS). The enrollee's characteristics impacted the plans' PCS score and the PCS impacted the MCS.	Plan attrition, beneficiary attrition, self-reported disease status, and the fact that HEDIS quality measures do not capture all aspects of plan services that may influence patient outcomes.

Herrin	2015	Retrospective Cohort	4,073 Hospitals in 2,254 counties	Readmission rates reported via CMS Hospital Compare website, AHA Annual Survey, HRSA Area Resource File, CMS Nursing Home Compare, Nielsen Popfacts, CDC NCHS Urban-Rural Classification Scheme for Counties	HLMs were used to determine variance between risk standardized readmissions by hospital.	Multivariate analysis of the impact of county level characteristics on hospital readmissions	58% of national variation in hospital readmissions was explained by county characteristics, the strongest of which was access to care, socioeconomic status, physician mix, and nursing home quality.	This is an observational study so causality cannot be found. The number of studied conditions is limited to 3, data examined were at the county level, the AHA survey may include as a single hospital multi-hospital systems.

Holmes	2013	Retrospective cohort	677,580 patients receiving prescriptions through Medicare part D in 2008	2007 & 2008 Medicare part D event files and part B claims data for 100% sample of Texas traditional Medicare beneficiaries. MDS data to identify nursing home stays. Medicare denominator file was used for demographic data.	Receipt of at least one PIM defined as being contained in the 48 medications or medication classes included in the 2003 Beers list	Multivariate analysis of the odds of PIM receipt at the level of primary care prescriber controlling for patient characteristics	31.9% of Medicare part D beneficiaries studied received a PIM. Sex, ethnicity, low-income subsidy eligibility and hospitalization were associated with PIM use. The strongest association with PIM prescribing was increasing number of prescribers and medications. Black beneficiaries had a higher odds ratio of PIM receipt than white, Hispanic, Asian and other. LIS subsidy eligibles had a higher odds ratio of receiving a PIM than nonsubsidy eligibles.	Geographic and plan enrollment limitations limit the generalizability of the findings.

Hu	2014	Retrospective cohort	Medicare traditional beneficiaries ages 65+ discharged from an urban safety-net hospital in 2010	Corporate data store Henry Ford Hospital	30 day readmission	Multivariate logistic regression was used to examine the association between 30-day readmissions and patient and neighborhood characteristics.	Male, black and currently unmarried patients were more likely to have at least one readmission than female, nonblack and currently married patients. A larger proportion of patients residing in neighborhoods with low education, high poverty and low household income had at least 1 readmission, compared to those living in other neighborhoods. Comorbidities were higher among those with a readmission than among those without. Across the 3 socioeconomic factors, older and male patients were significantly more likely to be readmitted within 30 days than younger and female patients. Currently married patients were significantly less likely to be readmitted that patients who were unmarried. The 3 SES variables were all significantly associated with patients' having at least one 30-day readmission.	Data from a single hospital, one year's historical inpatient diagnoses which might underestimate the severity of the patients' illnesses, lack of data re: post-discharge clinical care; community support used marital status as a proxy for community support.

Inovalon 2013	2013	Retrospective cohort	1,335,709 enrollees in 2011 and 1,605,644 enrollees in 2012; 520 Medicare advantage contracts	CMS published data and the Inovalon "MORE" Registry	10 quality measures included in the Medicare stars methodology (see appendix c for list of measures)	Using logistic regression, stratified rates were calculated for 10 star measures. Individual beneficiaries were stratified based on Medicaid eligibility, age, gender, race, region, original reason for Medicare entitlement, and comorbidity.	Dual eligibles perform worse than nonduals on 8 of 10 measures after adjusting for other factors. Duals had significantly worse treatment rates for arthritis and osteoporosis. Duals have significantly worse preventive screening rates for breast cancer and glaucoma. Sicker members do better on mammography than well members. Duals are more likely than nonduals to be readmitted after a hospital stay. Duals have higher use of high-risk medications; adherence rates are lower for duals on all 3-adherence measures.	Individual-level analysis conducted using a data set limited to consulting group client base; ecological fallacy may be present when examining data at the plan level; research conducted by a consulting group whose clients include health plans.
Inovalon 2014	2014	Retrospective cohort	2,319,457 Medicare Advantage members in 81 contracts and 436 individual plan benefit packages in 2013	Data from six Medicare Advantage health plans and the Inovalon "MORE" Registry	18 measures of quality, 8 2014 star measures and 10 display HEDIS measures	Member-level analysis of the impact of demographic, clinical, SES and community resource factors on performance differentials between dual and nondual beneficiaries	Dual members performed significantly worse on 10 of 18 measures, including 6 of the 8 star measures. Dual members performed significantly better on 5 of 18 measures, 3 of which are related to drug treatment and 2 of which are related to substance use/abuse. Dual members performed similar to nonduals on three measures including access to primary care visits implying that differential performance is not due to access to primary care.	Data set limited to 6 self-selected plans and consulting group database; research sponsored by health plans and conducted by a consulting group whose clients include health plans.

Inovalon 2015	2015	Retrospective cohort	2,207,940 Medicare Advantage members from 81 MA contract with 364 individual plan benefit packages	Health plan data, Inovalon's MORE^2 registry, CMS monthly membership reports, Acxiom's market indices ACS data, the Area Health Resource File	The effect of dual status on measure performance with and without adjusting for specific individual and plan factors	Three types of linear mixed models	The effect of dual status was significant and negative for 8 measures after controlling both for plan and for the percent of dual eligibles served by the plan. Differences in clinical, SES and community resource characteristics between dual eligible and nondual eligible members accounted for 70% or more of the performance gap observed in the seven star measures analyzed. SES characteristics were consistently the main contributor accounting for at least 30% of the observed disparities.	Study conducted for an organization that provides consulting services to health plans. Study partially underwritten by health plans.

Joynt	2011	Retrospective cohort	3,163,011 Medicare discharges for myocardial infarction, congestive heart failure and pneumonia among beneficiaries aged 65+ in the 50 US States	Medicare Provider Analysis Review files from 1/1/06-11/30/08	Risk adjusted odds of readmission	Comparison of black and white patients for each condition using Wilcoxon tests for continuous data and X^2 tests for categorical data; multivariate logistic regression to determine risk-adjusted odds ratio of readmission.	White patients at nonminority serving hospitals had the lowest odds of readmission, black patients at minority serving hospitals had the highest. Patients discharged from minority serving hospitals had a 23% higher odds ratio of readmission than those discharged from a nonminority serving hospital. Among patients with acute MI, black patients had 13% higher odds of readmission regardless of site of care but 22% higher odds of readmission at a minority-serving hospital. There was no significant interaction between race and site of care.	Use of administrative data, lack of data on medication and nonprocedural treatments, lack of data on transitions of care and outpatient care, age restricted study population limits applicability of findings to younger patients.
Joynt	2013	Retrospective cohort	3282 hospitals subject to the Medicare HRRP program	HRRP Supple-mental Data File; AHA 2011 annual survey of hospitals	Adjusted and unadjusted odds ratios	Multinomial Logistic regression to calculate the odds of receiving an HRRP penalty or a high or a low penalty, Multivariate analysis to calculate an adjusted odds ratio.	66.7% of hospitals were penalized under the HRRP in 2013. Large hospitals, teaching hospitals and safety net hospitals (defined as high DSH hospitals) have higher odds of receiving a penalty. Using an adjusted odds ratios safety net hospitals were the most likely to be highly penalized.	Study at the hospital level, no agreed on method to identify safety net hospitals, one year performance snapshot.

Jung	2016	Retrospective Cohort	149,773 assessed for risk of fall, 113,650 assessed for bladder control intervention, 383,207 assessed for physician monitoring of physical activity	Medicare Health Outcomes Survey results for 2010 and 2013	Plan performance on 3 measures included in the HOS	Multivariable logistic regression stratified by health plan adjusted for plan level characteristics	Similar results were found for differences in receipt of the three studied services examined by black/white race, Asian/white race and Hispanic/white ethnicity. After the introduction of pay for performance the gaps decreased between Hispanics and whites for 2 measures and black and white beneficiaries for one measure.	Self-reported measures of quality, measures of chronic condition did not include level of severity, study was not able to account for provider-patient language concordance.
Kahn	2015	Descriptive statistics	Adult, nonfederal acute care hospitals paid under the Medicare Inpatient Payment System	CMS IPPS final rule impact file	Penalty under the VBBP, Hospital VBP or HAC programs	Logistic regression to assess the odds ratio of a hospital receiving a penalty based on hospital characteristics (DSH percentage, teaching, number of beds, type of ownership, geographic location)	Teaching status and bed size significantly increase the odds of receiving a penalty. Major teaching hospitals are 1.60, 2.58, and 4.04 times more likely than nonteaching hospitals to receive a penalty in the Hospital VBP, the HRRP, and the HAC Reduction Program, respectively. Hospitals with 51-65% DSH percentage (not the highest percentage of 65+) fare most poorly under the three programs 2.39, 1.20 and 1.51 times more likely than hospitals with 0-25% DSH to receive a penalty in the Hospital VBP, the HRRP, and the HAC Reduction Program, respectively.	Hospital-level analysis, DSH as a proxy for safety net status

Kind	2014	Retrospective cohort	Medicare traditional patients discharged with congestive heart failure, pneumonia, or myocardial infarction between 2004 and 2009	Random 5% national sample from the Medicare chronic conditions data warehouse; 255,744 patients	30-day rehospitalization	Logistic regression of the relationship between ADI grouping and 30-day rehospitalization	30-day rehospitalization rates did not vary significantly across the least disadvantaged 85% of neighborhoods but within the most disadvantaged 15% rehospitalization rates increased from 22 to 27% with increasing deprivation. This relationship persisted after full adjustment for SES characteristics, comorbidities, severity of illness	Using ZIP code data, the results may not apply to beneficiaries without permanent addresses; census data may not reflect detailed neighborhood and individual characteristics; any nonindividual measure including ADI can introduce ecological fallacy; the quality of care in hospitals serving high ADI communities could have influenced the findings
Krumholz & Parent	1997	Retrospective cohort	Medicare traditional beneficiaries in Connecticut over age 65 who were hospitalized with a diagnosis code of congestive heart failure	CT MedPAR file	Readmissions for congestive heart failure within 6 months of discharge and readmission or death within 6 months of discharge	Bivariate and multivariate logistic regression analysis to identify the association between patient age, sex and clinical data and readmission	Increasing age was positively associated with mortality and negatively associated with readmission. Male sex combined with a prior admission and a co-morbidity score of >1 was a significant predictor of readmission. Patients 85+ had a higher likelihood of readmission than patients between 65-74 but age was not a significantly associated with readmission.	Limited data set, lack of clinical data, and limited geographic sample all limit the generalizability of the findings to other regions.

			and survived the index admission			within 6 months after discharge to determine the spectrum of diagnoses responsible for readmission for patients with congestive heart failure.	White race and male gender were independent predictors of readmission.	
Krumholz & Chen	2000	Retrospective cohort	Medicare traditional beneficiaries in Connecticut over age 65 who were admitted to any of 18 hospitals with a diagnosis code of heart failure and survived the index admission in 1994-95	MEDPAR data applied to 9 CT hospitals and 12 hospitals in an initial sample and then a validation sample. 3 hospitals but no patients appeared in both samples.	Readmission for heart failure within 6 months of an index admission	Bivariate and multivariate logistic regression analysis to identify the association between patient age, sex and clinical data and readmission within 6 months after discharge to determine the factors significantly associated with readmission.	Of 32 patient and clinical factors, only 4 were found to be significantly associated with readmission: prior admission within 1 year, prior heart failure, diabetes, and creatinine level >2.5 mg/dl. Among all individuals with an index admission of heart failure more than 25% were readmitted. Demographic factors examined were not significantly associated with readmission (age, gender, and race).	The study relied on administrative data and retrospective medical record so possible misclassification . Limited to age 65+ so possibly not generalizable to a younger population. The study was limited to hospitals in CT so limited geographic generalizability. No information about outpatient management. No information on other important variables such as quality of life.

Lindenauer	2013	Retrospective cohort	Medicare patients aged +65 hospitalized in 2006-08 with a principle diagnosis of myocardial infarction, heart failure or pneumonia; 555,962 admissions for myocardial infarction, 1,092,285 for heart failure and 1,146,414 for pneumonia	Medicare Data file, American Community Survey, Kaiser Family Foundation, individual patient HCC scores	Readmission and mortality	For each condition they fit a series of three-level hierarchical regression models that incorporated patient, hospital and state effects, In each model the gini coefficient (measured at the state level) served as the primary predictor	Models that adjusted for patient-level estimates of SES continued to show a significant association between income inequality and readmission for all 3 conditions. The authors estimate that nearly 39,000 readmissions are associated with residence in states in the three highest quarters of income inequality compared with the states in the lowest quarter. More than 66% of patients were cared for in hospitals located in states with the 2 highest quarters of inequality. Associations we attenuated by but remained significant after adjustments for patient, state and hospital characteristics including adjustment for individual estimates of income and education.	The analysis included only Medicare beneficiaries with 3 conditions. Age, diagnosis and insurance status could modify the relationship between inequality and outcome, the regression analysis controlled for some, but not all, possible confounders so there could be residual bias, the time of the study does not take into account the differential timing between exposure to inequality and outcome; income levels were estimated using ZIP code rather than individual data; inequality was measured at the state level; analysis did not account for competing risks of death.

Mahmoudi	2016	Restrospective Cohort	3735 Medicare beneficiaries, 1235 participating in MA and 2500 in Traditional Medicare	2006 and 2011 Household component of the MEPS survey	Diabetic foot checks, diabetic eye exam, cholesterol check among diabetics, flu vaccination among diabetics	Propensity score weighting between MA and traditional Medicare, Application of the IOM's framework for measuring disparities, multivariable differences in differences models for each outcome variable and logistic regression for dichotomous variables	There were differences within racial and ethnic groups between MA and traditionalMedicare but there was not a selection bias. For African Americans disparities grew in two of the four measures and shrunk in the other 2 in MA. For Hispanics disparities decreased significantly in 3 of the 4 quality measures.	No information regarding differences in MA plans or their pentration. No ability to control for individual preferences in diabetes management.

McBean	2003	Retrospective cohort	293 of the 301 managed care plans that provided data to Medicare in 1999 representing individual-level data on 157,394 enrollees	Individual-level data from the 1999 Medicare denominator file and the group health plan master file	Poor Blood Sugar control among diabetics	Bivariate and multivariate analysis	In 1999 32.7% of older Medicare health plan members had not had a glycemic test or had poor glycemic control. Asians had the lowest age and sex adjusted rates of poor glycemic control. The age and sex adjusted rates for blacks and Hispanics were statistically significantly higher than they were for whites. Hispanics on Medicaid had rates of control similar to whites on Medicaid. Covariates associated with increased risk of poor glycemic control were younger age group, Medicaid-administered program, for-profit plan, independent practice association model plan, smaller plan, >3% minority rate plan, location of plan in the south or northeast, not receiving each service included in the diabetes care measure.	Data limited to the HEDIS specifications which limit the study population and assume a definition of glycemic control that might be viewed as liberal. Because the study was done on 1999 data which was the first year plans reported the glycemic control measure, they found reporting inconsistencies and error limiting the number of plans included in the study.

McHugh	2010	Retrospective cohort	239,953 index admissions for heart failure (HF); 193,421 index admissions for acute myocardial infarction (AMI); 350,740 index admissions for pneumonia	2008 Medicare provider analysis and review (MEDPAR) file and the American Hospital Association Annual Survey of Hospitals	30-day all cause readmission	Generalized estimating equation models to determine an odds ratio of 30 day all cause readmission	Purpose was to examine the baseline risk of readmission by race following a hospitalization for AMI, HF or pneumonia. In all instances black and Hispanic patients, we readmitted more frequently than white patients. All differences were statistically significant, except the difference between white and Hispanic beneficiaries for pneumonia and HF. Black patients had a 9%, 13% and 21% higher odds of readmission than whites from HF, AMI and pneumonia respectively. Hispanics had a 20% higher odds ratio than whites for readmission after AMI. Disparities remained consistent after controlling for comorbidities and hospital characteristics.	Used Elixhauser comorbidity indicators and indicators from the CMS chronic conditions warehouse as they did not have patient-specific comorbidity data
Nagasako	2014		111,329 unique patients with AMI, 25,729 unique patients with pneumonia and 22,433 unique patients with HF all readmitted to hospitals in Missouri	Administrative data from the Missouri Hospital Association, census data from Truven Health Analytics and Nielsen Pop-facts	30 day readmission for AMI, HF and Pneumonia	Backward selection stepwise regression on a group of SES variables interacted with race and discharge home following index admission. Calculated risk-standardized readmissions	Although the average risk-standardized readmissions rate did not change significantly for any of the cohorts, the overall range of hospital performance in each of the measures was substantially narrower, declining from 6.5 % to 1.8% for AMI, 14.0% to 7.4% for heart failure, and 7.4 to 3.7 % for pneumonia. Risk-standardized readmission rates calculated	Use of census data as a proxy for individual social factors, Missouri only data which limits generalizability, exclusion of discharges without a patient residence.

			between 6/1/09 and 5/31/12			using the Medicare HRRP methodology using both the baseline and socioeconomic factor-enriched models	using the socioeconomic-factor-enriched models increased regression toward the mean for both high and low penalty hospitals	

Priest	2012	Retrospective Cross sectional analysis	183,213 individuals age 65+ in 2006 continuously enrolled in a Medicare Advantage plan through 2007 with at least one condition of interest in the 2006 calendar year and met specific clinical criteria	A single large national plan sponsor offering MAPD plans which provide part D benefits	Disease specific measures for asthma, COPD, depression and diabetes	Multivariate analysis of disease specific quality measures by LIS status; patients were assigned to condition-specific cohorts	Differences in quality of care, cost, adherence and resource use were seen by condition and by subsidy status. Findings on quality measures were higher for nonsubsidy patients than subsidy patients but medication use and adherence we higher for subsidy eligibles than nonsubsidy eligibles.	The study was conducted using claims data. However just because a prescription was filled doesn't mean it was taken. In addition, because retrospective there is a possibility for confounding, bias and misclassification of patients.
Qato	2012	Retrospective cohort	6,204,824 enrollees aged 65 and up in 415 Medicare advantage plans in 2009	Individual-level Medicare HEDIS data for 2009 obtained from CMS	Receipt or nonreceipt of one or two high risk medications	Fitted generalized linear regression models to model outcomes on a risk difference scale	Wide geographic variation in prescribing patterns not explained by SES characteristics. Female gender, white race, a low score on the AHRQ SES index and low personal income predicted receipt of HRMs.	No information on whether propensity of obtaining mental health services impacts the prescribing differential by race. No information on the number of prescriptions, diagnoses, clinical information, and the impact of comorbid conditions.
Rathore	2003	Retrospective cohort analysis	29,732 Medicare traditional beneficiaries hospitalized for heart failure in 1998 and 1999	Medicare beneficiary medical records obtained through the National Heart Failure Project, the	Readmission within one year of discharge and mortality within one year admission	Multilevel logistic regression models adjusted for age, sex and medical history, X^2 tests were used to evaluate racial differences. Logistic regression also	Black patients had higher crude one-year readmission rates than white patients. Racial differences were highest among patients age 85+. Racial differences in readmission varied by geographic region and	Findings may not be applicable to nonhospitalized patients in the ambulatory setting. They may not be applicable to conditions other than heart failure. The data do not

				AHA Annual Survey of Hospitals, the AMA Physician Masterfile		adjusted for physician, hospital and geographic characteristics.	by hospital. Mortality rates were lower for blacks.	provide any information regarding quality of life.
Rathore	2006	Retrospective cohort	30,968 Medicare beneficiaries age 65+, in the 50 states and DC who were not excluded for specific co-morbid conditions and who were hospitalized with heart failure between March 1998 and April 1999	Medicare beneficiary medical records obtained through the National Heart Care Project, US Census data by ZIP code	Readmission within 1 year of discharge, mortality within 30 days and 1 year of admission	Hierarchical logistic regression models were used to assess the association of SES, quality of care and outcomes adjusting for patient, physician and hospital characteristics	SES was not associated with 30-day mortality after multivariable adjustment. SES was associated with a higher risk of 1-year mortality. Lower SES patients had a higher risk of readmission within 1 year of discharge compared to higher SES patients.	Use of census-level, rather than individual-level, data could limit accuracy, limiting the study population to patients' age 65+ limits generalizability to younger populations, outcomes were limited to readmission and mortality.

Rodriguez	2011	Retrospective cohort	4,550 hospitals and 1,173,153 Medicare patients	Medicare Provider Analysis Review files from 1/1/06-11/30/08; the American Hospital Association Annual Survey of Hospitals, Hospital Quality Alliance data	30-day all-cause readmission for heart failure and acute myocardial infarction	Logistic regression models to test patient ethnicity as primary predictor of readmission and Hispanic serving hospitals as primary predictor of readmission and the interaction between the two (ethnicity and Hispanic serving hospital). Models were adjusted for patient comorbidities using the Elixhauser methodology and for hospital characteristics.	Hispanic patients discharged for both conditions were younger, had more co-morbid conditions and were more often female than white patients. Hispanic patients had slightly longer lengths of stay. Nearly 70% of Hispanic patients were served in Hispanic serving hospitals (those serving the top decile of Hispanic patients). After adjusting for comorbidities and patient characteristics, Hispanic patients had a 2% higher odds ratio of being readmitted in 30 days for either condition compared to white patients. Hispanics served at Hispanic serving hospitals had the highest rates of readmission (quadrant analysis).	Possible misclassification of individuals as Hispanic, use of administrative rather than clinical risk adjustment models, only included Medicare patients so possibly not generalizable to a younger population, lack of SES data to determine the impact of SES impact, lack of patient-level case mix (used hospital-level data), lack of data regarding transitions of care and access to outpatient services.

Schmajuk	2011	Retrospective cohort	Eligibility for the HEDIS rheumatoid arthritis (RA) measure per the measure specifications, participant age 65+, residence in the 50 US States, survival through the measurement year.	HEDIS data for 93,143 individual patients >65	DMARD (disease modifying Antirheuimatic drug) receipt among eligible enrollees	3 versions of an analytic model. Model 1 adjusted for age, race, sex, income and year; Model 2 adjusted for everything in model 1 plus ZIP-code- based SES, geography and residence in a HPSA; Model 3 included all of model 2 plus plan attributes (model type, plan age, enrollment size and tax status). Assessed variability in plan performance and applied regression coefficients from multivariate logistic regression to calculate the predictive probability of DMARD receipt in each health plan for each individual.	SES, geography, age and plan type matter. Patients who were older and who were male were less likely to receive DMARDs. Low personal income and low SES were associated with lower DMARD receipt. Low SES neighborhood had an effect independent of individual low income. Mid- and South-Atlantic residence correlated with less DMARD receipt. 70% spread between the worst and best performing health plans. Patients in HPSAs were significantly less likely to get DMARDs.	RA diagnoses were obtained from administrative sources creating a possibility that some patients we misclassified. Lack of data on co-morbidities and patient preferences that could have impacted prescribing practices. Lack of data on the prescriber's specialty. Lack of data on prescription drug benefits available by plan to determine the impact of out-of-pocket cost on prescribing practices.

Schneider	2002	Retrospective cohort	305,574 MA beneficiaries >65 who had data on 1 of 4 HEDIS measures	1998 HEDIS file obtained from CMS	Breast cancer screening, eye examinations for patients with diabetes, beta blocker use after an MI, follow up after hospitalization for mental illness	The authors tabulated the number of enrollees by HEDIS measure and calculated the percentages with each SES characteristic; calculated performance on each measure as a percentage of eligible enrollees who received the specified service, comparisons were made using X^2tests or ANOVA	Blacks were significantly less likely than whites to receive each of the HEDIS measured services. The unadjusted differences ranged from 6.8% for eye examinations for patients with diabetes measure to 20.8% for the follow up after hospitalization for mental illness. These differences were not resolved as a result of controlling for SES and the impact of SES differed by measure. Part, but not all, of the disparity was explained by disproportionate enrollment of blacks in poorer performing health plans.	The study was not designed to identify the features of managed care that were associated with racial disparities. The authors lacked information on comorbidities, and attitudes toward the health care system. The limitations of the HEDIS data and lack of utilization data outside the HEDIS specifications could have biased the results.

Scheingold	2016	Retrospective Cohort	All US Hospitals and readmission for the relevant conditions in the time period (number unstated in the article)	Medicare hospital claims data in 2009 and 2012 to calculate HRRP penalties for 2013 for HF, MI and CAP. Patient characteristics from Medicare claims data, hospital data from the American Hospital Association Annual Services and Area Health Resource files	Readmission rates as defined under the HRRP for MI, HF and CAP to high and low DSH hospitals.	Logistic regression consecutively adding hospital and person covariates with and without the HRRP risk adjustment variables measuring in method one relative risk of readmission and in method 2 the odds ratio given certain factors. Wald test was used to measure the effect of the covariates separately on high and low DSH hospitals.	In both years differences were found in high and low DSH hospitals. Patients in low DSH hospitals were less likely to be nonwhite or urban. Readmission rates higher in high DSH hospitals in both years. The unadjusted odds ratio of readmission in a high DSH hospital was 16-17% higher than a low-DSH hospital. Applying HRRP risk adjustment factors the difference fell to 11% in 2009 and 12% in 2012. Adding patient-level SES, race and dual eligibility reduced it to 8% in 2009 and 9% in 2012. Adding other variables, the odds of readmission remained 6-7% greater. The current expected readmission rate formula accounts for most of the impact of other factors on High DSH hospitals.	Only a limited number of covariates can be constructed from Medicare claims data, DSH percentage was used as a proxy for safety net hospital

Singh	2013	Retrospective cohort	514,064 admissions to 272 hospitals in Texas for medical diagnoses from 2008-2009	Medicare summary files: MedPAR and OutSAF and Medicare Carrier files	30-readmission rates for medical diagnoses	Multivariate logistic regression.	Measurable patient characteristics alone account for 56.2% of the variation in readmission rates. An additional 7.2% was explained when hospital characteristics were added and a further 0.8% when provider type was included. After adjustment for patient characteristics all hospitals' readmission rates regressed toward the mean. Higher odds of readmission were associated with male gender, Medicaid eligibility, a higher DRG weight and having been admitted to the hospital in the prior year. Nonwhite populations had a protective effect when controlling for other factors.	Study of a single state over a 2-year period limiting generalizability. Exclusion of patients who required care in an ICU also limiting generalizability to those patients.

Tsai	2014	Retrospective cohort	1,508,402 Medicare traditional beneficiaries aged 65+ with admissions in the 6 index procedures	Medicare provider analysis review files from 2007-2010 for inpatient hospitalizations; 2010 American Hospital Association survey to identify hospital characteristics; Hospital compare	Risk adjusted odds ratio of 30-day all cause readmissions for patients with an index admission for coronary artery bypass grafting, pulmonary lobectomy, endovascular abdominal aortic aneurism repair, open abdominal aortic aneurism repair, colectomy, and hip replacement	Multivariate logistic regression. Patients were categorized into 4 groups by race and hospital type and multiple sensitivity analyses were performed.	Black patients had higher readmission rates than white patients. Both race and site of care were independent predictors of readmission. Hospitals serving high proportions of minority patients had higher readmission rates for both their black and white patients. Adjusting for teaching status, size, ownership and region did not significantly change these results.	Administrative data were used for risk adjustment, lack of data on discharge planning and use of care transition practices, limited to age 65+ because of the use of Medicare data limiting generalizability to younger populations, cannot determine if the results are causal or correlative because it is an observational study.

Trivedi	2006	Retrospective cohort	431,573 Medicare Advantage enrollees in 151 plans	HEDIS data for plans years from 2002 to 2004, Medicare enrollment files, ZIP-code-level data on poverty and education from the 2000 U.S. Census	4 HEDIS measures: Blood Sugar control, LDL-C control among diabetics, Blood Pressure control, LDL-C control after a coronary event	Bayesian estimation to achieve a 95% CI. Using 6 health plan fixed effects and 6 individual fixed effects. Quality ratings were assigned by using a t-test of whether the plan's performance rate for whites was statistically different from the performance rate for whites in all other plans and comparing the absolute white-black disparity adjusted for age and sex.	Disparities vary widely among plans and are only weakly correlated with the overall quality of care. The mean performance on all 4 HEDIS measures was significantly lower for black enrollees than white enrollees ($p<.001$) with absolute percentage point differences ranging from 6/8% for blood pressure control to 14.4% for LDL-C control.	The authors lacked information about clinical and SES characteristics at the individual level. They were unable to include a provider-level analysis. They were unable to analyze disparities for Hispanic, Asian, and Native American Medicare beneficiaries due to data limitations.

Trivedi	2005	Retrospective cohort	1.8 million individual-level observations from 183 health plans that had been continuously enrolled in Medicare for 5 years from 1997 to 2003	CMS HEDIS data for Medicare managed care plans for the reporting years 1998-2004 for care that was delivered from 1997-2003	9 HEDIS measures related to breast cancer, diabetes care and cardiovascular care	Matched the healt identification code of each enrollee with HEDIS data on at least one measure to obtain demographic data on race, sex, age, and ZIP code. Fitted separate linear models to combine data from the first and last useable year for each measure. Conducted significance testin for quality and for race. Ran 3 model - the first adjusted for age and sex, th second for age, se rural residence an health plan, and th third for all covariates. All analyses are reported with 2-tailed P-values	Quality of care improved during the study for all measures for both blacks and whites. The disparity between blacks and whites narrowed significantly on 7 of 9 measures. Adjustments for age and sex had little impact on disparities. Additional adjustment for health plan and rural residence reduced disparities in the initial and final year for 6 of 9 measures and rendered one disparity no longer significant. The additional adjustment for SES further reduced the magnitude of disparities in both the initial and final year. Disparities remained at 7% or greater for 3 measures (control of LDL cholesterol for enrollees with diabetes or heart disease) and control of glycosylated hemoglobin.	The study was not designed to address the factors that may have caused the observed results. The study used only black and white race due to lack of race data. The study did not include risk adjusted outcome measures due to lack of detailed clinical information. The study did not include a provider-level analysis due to lack of individual provider-level performance data.

Virnig	2002	Retrospective cohort	7,498,496 enrollee records from 301 M+C plans	CMS	Breast cancer screening, cholesterol control after AMI, diabetes care, control of high blood pressure	All measures were adjusted for age and sex using direct standardization methods. Logistic regression was used to estimate adjusted odds ratios. Income adjustment was conducted for all multivariate regression models to confirm that estimates of racial/ethnic variation were not explained by income differences. The researchers calculated both the odds ratio of receiving the measured care and the rate of individuals receiving the needed care per 100 enrollees	Racial disparities persist even after controlling for age and sex. Compared with white women, Hispanic and native American women showed even greater disparities in mammogram receipt than black women. Black persons were the only group for which rates of diabetes care were significantly lower than for whites.	The Medicare + Choice population is self-selected so the results may not be able to be generalized to the entire Medicare population. Data accuracy depends on CMS reporting accuracy. Racial groups are heterogeneous. There is no direct information on education or income. ZIP-code-level data were used and aged. Lack of data for some variables impacts the statistical power of the findings. The data were not available to adjust for illness severity of comorbidity.

Virnig	2007	Retrospective cohort	5.1 million Medicare+Choice enrollees in 2003 from 148 plans	2004 individual-level HEDIS results for plans and 2003 Medicare enrollment and demographic data and US Census data	Breast cancer screening, comprehensive diabetes care, beta blocker after heart attack, cholesterol management, controlling high blood pressure, follow up after hospitalization for mental illness	Multiple regression models used to assess the impact of age, sex, area income, plan size, percentage of the region black, race, geography and race/geography interaction. Adjusted rates were calculated for each measure.	For all measures, geographic areas with higher percentages of blacks had significantly lower HEDIS quality scores. Within all regions of the country small but significant levels of racial disparity were observed. The authors found significant geography/race interactions for all measures, except controlling high blood pressure. With few exceptions, the geographic disparity between regions is greater than the within region disparity.	The authors were unable to assess whether racial disparities were similar in plans that did not submit data or submitted it without identifiers necessary to run the analysis.

Virnig	2004	Retrospective cohort	Individual-level data from 301 Medicare+Choice plans on 7,498,496 persons aged 65+	Plan HEDIS data matched to the Medicare Denominator file for 1999	Mental health inpatient discharges, Average LOS for mental health inpatient stays, % of members receiving mental health services, 7 and 30 day follow up after hospitalization for mental illness, antidepressant medication management,	Multivariate logistic regression	The authors found a low quality of mental health care for all beneficiaries. Nonetheless, there was strong variation among racial groups on all measures. The odds ratio of follow up care after hospitalization for mental illness for African Americans was 0.5 compared with whites after controlling for age, sex, income, number of admissions, average length of stay, plan design and profit status and geography. These associations persist even after stratifying plans for minority enrollment. Racial variation in acute and continuation phase treatments persisted for all nonwhite populations after multivariate regression was applied.	There is some level of disagreement about the measures that may be reflected in the data, the data are limited to the measurement period and don't include FFS history, and there is no ability to understand the reasons for the failure to receive adequate follow up care. HEDIS data report on rates of services delivered not need.

Young	2014	Retrospective cohort	478 Medicare part D Health Plans	CMS Medicare part D plan files	Medication adherence measures for diabetes, blood pressure and cholesterol	Univariate and multivariate regression analyses to assess the relationship between a health plan's adherence scores and the socioeconomic composition of its enrollee population. Simulation of the impact of adjusting for socioeconomic characteristics of plan membership	The socioeconomic composition of a Medicare part D contractor's enrollee population has a substantial influence on performance ratings.	This study was conducted at the plan level rather than at the individual enrollee level creating the possibility of ecological fallacy. The study used proxy measures of SESS based on census data.

APPENDIX E: SES CHARACTERISTICS ACCOUNTED FOR BY HOSPITAL STUDY

SES Characteristics Accounted for in the Studies of Hospital Readmissions

Variable	Aranda	Arbaje	ASPE	Barnett	Bernheim	Blum	Carey	Calvillo-King	Damiani
Age	x	X		X	X	X	X	N/A	N/A
Sex	x	X		X	X	X	X	N/A	N/A
Race	x	X	X	X				N/A	N/A
White (Caucasian)	X			X				N/A	N/A
Black (African American)	x		X	X				N/A	N/A
Asian								N/A	N/A
Hispanic			X	X				N/A	N/A
Other	x	X		X				N/A	N/A
Geography	x	X	Rurality					N/A	N/A
Marital status		X		X				N/A	N/A
Comorbidities or HCC score	x	X	Disability	X	X	X	X	N/A	N/A
SES/Other	Previous hospitali-zations, history of device implantation	high school diploma, income <$25,000, Medicaid; Various social and functional characteristics	Dual eligible; ZCTA level income, educational attainment, employment rate, home value and English proficiency	Education, Labor force participation, total assets, household income, household debt, original reason for entitlement to Medicare, Medicaid, ESRD; various social and functional characteristics	Zip code median income; hospital characteristics	AHRQ SES index by 9-digit ZIP code	% of patients eligible for SSI; hospital characteristics	hospital character-istics	hospital character-istics

Variable	Eapen	Figueroa	Fischer	Greysen	Gu	Herrin
Age	X	N/A	N/A	X	X	X
Sex	X	N/A	N/A	X	X	X
Race	X	N/A	N/A	X	X	
White (Caucasian)	X	N/A	N/A	X		
Black (African American)	X	N/A	N/A	X	% catchment area black	
Asian	X	N/A	N/A			
Hispanic	X	N/A	N/A	X		
Other	X	N/A	N/A	X		
Geography	X	N/A	N/A			X
Marital status		N/A	N/A	X		X
Comorbidities or HCC score	X	N/A	N/A	X	X	X
SES/Other	Median household income, median home value, persons aged >25 with a high school diploma or more, persons aged > 25 with 4+ years of college or more, white collar workers; Hospital characteristics	Hospital characteristics	Hospital characteristics	Income, wealth, high school diploma; functional impairment	Dual eligible status; Hospital characteristics	Hospital Characteristics, Nursing home characteristics, community characteristics, urban/rural, retirement destination, educational attainment, % Medicare

Variable	Hu	Joynt 2011	Joynt 2013	Kahn	Kind
Age	X	X	N/A	N/A	X
Sex	X	X	N/A	N/A	X
Race	X	X	N/A	N/A	X
White (Caucasian)		X	N/A	N/A	X
Black (African American)		X	N/A	N/A	X
Asian			N/A	N/A	
Hispanic			N/A	N/A	
Other			N/A	N/A	X
Geography			N/A	N/A	X
Marital status			N/A	N/A	
Comorbidities or HCC score	X	x	N/A	N/A	X
SES/Other	Neighborhood SES poverty, education, median household income	Medicaid eligible; Discharge destination, length of stay, death within 30 days, discharge from a minority serving hospital	Hospital characteristics	Hospital characteristics	Residence in a neighborhood scored based on area deprivation index; Length of stay, discharge to a skilled nursing facility, hospital characteristics

Variable	Krumholz & Parent	Krumholz & Chen	Lindenauer	McHugh	Nagasako
Age	X	X	X	X	X
Sex	X	X	X	X	X
Race	X	X		X	X
White (Caucasian)	X	X		X	
Black (African American)				X	
Asian					
Hispanic				X	
Other	X	X		X	
Geography			X		
Marital status					
Comorbidities or HCC score	X	X	X	X	
SES/Other	Medical history, Hospital characteristics	Medical history, clinical characteristics, hospital course, discharge labs, discharge mobility	Hospital characteristics	Hospital characteristics	Poverty rate, median income, educational attainment, housing vacancy rate and unemployment rate

Variable	Rathore & Masoudi	Rathore & Foody	Rodriguez	Scheingold	Singh	Tsai
Age	X	X	X	X	X	X
Sex	X	x	X	X	X	X
Race	X	X	X	X	X	X
White (Caucasian)	X	X	X	X	X	X
Black (African American)	X	X		X	X	X
Asian				X		
Hispanic			x	X	X	
Other	X	X		X	X	
Geography				X		
Marital status						
Comorbidities or HCC score	X	X	X			X
SES/Other	Composite measures of SES based on ZIP-code-level sociodemographic characteristics (ZQ rating); Admission characteristics, Hospital characteristics, Physician characteristics	Admission characteristics, admission source, medical history	Clinical characteristics, hospital characteristics, length of stay	Dual eligible; Discharge destination	Medicaid Eligibility; Hospital characteristics, Admission characteristics, DRG weights, relationship with a primary care physician, nursing home residence in the previous 90 days, previous admissions	Medicaid Eligibility; Hospital characteristic

APPENDIX F: SES CHARACTERISTICS ACCOUNTED FOR BY HEALTH PLAN STUDY

SES characteristics accounted for in the studies of health plan quality

Variable	ASPE	Ayanian	Ayanian	Bird	Brennan	Cahow	Chou 2007a	Chou 2007b
Age		X	X	X			X	
Sex		X	X	X	X		X	X
Race	X	X	X	X		X	X	
White (Caucasian)		X	X				X	
Black (African American)	X	X	X	Living in a predominantly black neighborhood		% service area black	X	
Asian		X	X					
Hispanic	X	X	X					
Other								
Geography	Rurality	X	X		X		X	X
Marital status								
Comorbidities or underlying health status	Disabled as a reason for entitlement							
SES/Other	Dual eligible; ZCTA level income	% Dual eligible		Living in a high poverty neighbor-hood	Dual Eligible status	% DSNP membership; median income of the population in the service area; educational attainment of the population in the service area	Household income in four categories	Household income in three categories

Variable	Couto	Fremont	Harman	Holmes	Inovalon 2013	Inovalon 2014	Inovalon 2015
Age	X	X	X	X	X	X	X
Sex	X	X	X	X	X	X	X
Race			X	X	X	X	X
White (Caucasian)			X	X	X	X	X
Black (African American)		Living in a majority black neighborhood	X	X	X	X	X
Asian				X	X	X	X
Hispanic			X	X	X	X	X
Other			X	X	X	X	X
Geography	X		X		X	X	X
Marital status			X				X
Comorbidities or underlying health status			X	X	X	X	X
SES	Receipt of low-income subsidy	Living in a poor neighborhood	Education level and home ownership	% Eligible for LIS in 2008; plan-level income geocoded from five-digit ZIP codes	% SNP; dual status; receipt of low-income subsidy; income	% SNP; dual status; receipt of low-income subsidy; income	8 indicators of individual and community income and resources

Variable	Jung	Mahmoudi	McBean	Priest	Qato	Schmajuk	Schneider
Age	X	X	X	X	X	X	X
Sex	X	X	X	X	X	X	X
Race	X		X		X	X	X
White (Caucasian)	X		X		X	X	X
Black (African American)	X		X		X	X	X
Asian	X		X				
Hispanic	X		X				X
Other					X	X	X
Geography		X	X		X	X	Rural residence
Marital status		X					
Comorbidities or underlying health status	X	X		X			
SES/Other	educational attainment, income, Medicare insurance plan, ADL impairments, self-reported health, BMI	Family income; Medicaid; health status; English speaking	Medicaid enrollment	Low-income subsidy	Low personal income; low SES as defined using the AHRQ SES score	Low personal income; low SES as defined using the AHRQ SES score	Dual eligibility; low-income area (25% or more of the residents in the ZIP code who are 65+ receive public assistance; college attendance (three categories)

Variable	Trivedi (2005)	Trivedi (2006)	Virnig & Lurie	Virnig & Scholle	Virnig & Huang	Young
Age	X	X	X	X	X	
Sex	X	X	X	X	X	
Race	X	X	X	X	X	% in the service area in a minority group
White (Caucasian)	X	X	X	X	X	
Black (African American)	X	X	X	X	X	
Asian			X		X	
Hispanic			X		X	
Other			X			
Geography	Urban Residence	X		X	X	
Marital status						
Comorbidities or underlying health status						
SES.Other	% Medicaid eligible; % below poverty; % attended college	% Medicaid eligible; % below poverty; % attended college	Household income	Income in four categories; median disposable income for households with persons age 65+	Median disposable income by ZIP code	% LIS; % without a high school diploma in the service area

APPENDIX G: MEDICARE ADVANTAGE PART C AND D MEASURES 2008-2016

(*Medicare 2016 Part C & D Star Rating Technical Notes* 2016)

Part	Measure name	Data source	2016	2015	2014	2013	2012	2011	2010	2009	2008	Notes
C	Access to Primary Care Doctor Visits	HEDIS	DMC11	DMC10	DMC12	DMC12	C11	C13	C12	C13	C09	
C	Adult BMI Assessment	HEDIS	C07	C08	C10	C10	C12	DMC05				
C	Annual Flu Vaccine	CAHPS	C03	C04	C06	C06	C06	C07	C06	C07	C07	
C	Antidepressant Medication Management (6 months)	HEDIS	DMC03	DMC03	DMC03	DMC03	DMC03	DMC03	DMC04	C28	C23	
C	Appropriate Monitoring of Patients Taking Long-term Medications	HEDIS	DMC05	DMC05	DMC05	DMC05	DMC05	C06	C05	C06	C06	
C	Beneficiary Access and Performance Problems	Administrative Data	C28	DME08	C31	C31	C32	C33	C30			
C	Breast Cancer Screening	HEDIS	C01	DMC22	C01	C01	C01	C01	C01	C01	C01	
C	Call Answer Timeliness	HEDIS	DMC02	DMC02	DMC02	DMC02	DMC02	DMC02	DMC01	C20	C16	
C	Call Center – Beneficiary Hold Time	Call Center	DMC09		DMC09	DMC09	DMC09	C34	C31			
C	Call Center - Calls Disconnected When Customer Calls Health Plan	Call Center	DMC12		DMC15	DMC15						
C	Call Center – CSR Understandability	Call Center							DMC02			
C	Call Center – Foreign Language Interpreter and TTY Availability	Call Center	C32		C36	C36	C36	C36	C33			
C	Call Center – Information Accuracy	Call Center			DMC10	DMC10	DMC10	C35	C32			
C	Cardiovascular Care – Cholesterol Screening	HEDIS		C02	C03	C03	C03	C03		C03	C03	A
C	Care Coordination	CAHPS	C25	C28	C29	C29						
C	Care for Older Adults – Functional Status Assessment	HEDIS	C10	C11	C12	C12	C14					

Part	Measure name	Data source	2016	2015	2014	2013	2012	2011	2010	2009	2008	Notes
C	Care for Older Adults – Medication Review	HEDIS	C09	C10	C11	C11	C13					
C	Care for Older Adults – Pain Assessment	HEDIS	C11	C12	C13	C13	C15					
C	Cholesterol Screening	HEDIS							C03			B
C	Colorectal Cancer Screening	HEDIS	C02	C01	C02	C02	C02	C02	C02	C02	C02	
C	Complaints about the Health Plan	CTM	C26	C29	C30	C30	C31	C30	C26			
C	Computer use by provider helpful	CAHPS	DMC21	DMC20								
C	Computer use made talking to provider easier	CAHPS	DMC22	DMC21								
C	Computer used during office visits	CAHPS	DMC20	DMC19								
C	Continuous Beta Blocker Treatment	HEDIS	DMC04	DMC04	DMC04	DMC04	DMC04	DMC04	DMC05	C32	C27	
C	Controlling Blood Pressure	HEDIS	C16	C18	C19	C19	C21	C19	C15	C29	C24	
C	Customer Service	CAHPS	C22	C25	C26	C26	C28	C27	C23	C22		
C	Diabetes Care	HEDIS							C14			C
C	Diabetes Care – Blood Sugar Controlled	HEDIS	C15	C16	C17	C17	C19	C17		C26	C21	D
C	Diabetes Care – Cholesterol Controlled	HEDIS		C17	C18	C18	C20	C18		C27	C22	D
C	Diabetes Care – Cholesterol Screening	HEDIS		C03	C04	C04	C04	C04		C04	C04	A
C	Diabetes Care – Eye Exam	HEDIS	C13	C14	C15	C15	C17	C15		C24	C19	D
C	Diabetes Care – Kidney Disease Monitoring	HEDIS	C14	C15	C16	C16	C18	C16		C25	C20	D
C	Doctor Follow up for Depression	HEDIS								C15	C11	
C	Doctors who Communicate Well	CAHPS	DMC08	DMC08	DMC08	DMC08	DMC08	C25	C21	C21	C17	
C	Engagement of Alcohol or other Drug Treatment	HEDIS	DMC16	DMC15	DMC19							

Part	Measure name	Data source	2016	2015	2014	2013	2012	2011	2010	2009	2008	Notes
C	Follow-up visit after Hospital Stay for Mental Illness (within 30 days of Discharge)	HEDIS	DMC01	DMC01	DMC01	DMC01	DMC01	DMC01	DMC03	C14	C10	
C	Getting Appointments and Care Quickly	CAHPS	C21	C24	C25	C25	C27	C26	C22	C17	C13	
C	Getting Needed Care	CAHPS	C20	C23	C24	C24	C26	C24	C20	C16	C12	
C	Glaucoma Testing	HEDIS			C05	C05	C05	C05	C04	C05	C05	
C	Health Plan Quality Improvement	Star Ratings	C29	C31	C33	C33						
C	Improving Bladder Control	HEDIS / HOS		C20	C21	C21	C23	C22	C18	C33		
C	Improving or Maintaining Mental Health	HOS	C05	C06	C08	C08	C09	C10	C09	C10		
C	Improving or Maintaining Physical Health	HOS	C04	C05	C07	C07	C08	C09	C08	C09		
C	Initiation of Alcohol or other Drug Treatment	HEDIS	DMC15	DMC14	DMC18							
C	Members Choosing to Leave the Plan	MBDSS	C27	C30	C32	C32	C33	DMC06	C29			
C	Monitoring Physical Activity	HEDIS / HOS	C06	C07	C09	C09	C10	C12	C11	C12		
C	Osteoporosis Management in Women who had a Fracture	HEDIS	C12	C13	C14	C14	C16	C14	C13	C23	C18	
C	Osteoporosis Testing	HEDIS / HOS	DMC06	DMC06	DMC06	DMC06	DMC06	C11	C10	C11		
C	Pharmacotherapy Management of COPD Exacerbation – Bronchodilator	HEDIS	DMC14	DMC13	DMC17							
C	Pharmacotherapy Management of COPD Exacerbation – Systemic Corticosteroid	HEDIS	DMC13	DMC12	DMC16							
C	Plan All-Cause Readmissions	HEDIS	C19	C22	C23	C23	C25					
C	Plan Makes Timely Decisions about Appeals	IRE / Maximus	C30	C32	C34	C34	C34	C31	C27	C35	C28	
C	Pneumonia Vaccine	CAHPS	DMC10	DMC09	DMC11	DMC11	C07	C08	C07	C08	C08	

Part	Measure name	Data source	2016	2015	2014	2013	2012	2011	2010	2009	2008	Notes
C	Rating of Health Care Quality	CAHPS	C23	C26	C27	C27	C29	C28	C24	C18	C14	
C	Rating of Health Plan	CAHPS	C24	C27	C28	C28	C30	C29	C25	C19	C15	
C	Reducing the Risk of Falling	HEDIS / HOS	C18	C21	C22	C22	C24	C23	C19	C34		
C	Reminders for appointments	CAHPS	DMC17	DMC16								
C	Reminders for immunizations	CAHPS	DMC18	DMC17								
C	Reminders for screening tests	CAHPS	DMC19	DMC18								
C	Reviewing Appeals Decisions	IRE / Maximus	C31	C33	C35	C35	C35	C32	C28	C36	C29	
C	Rheumatoid Arthritis Management	HEDIS	C17	C19	C20	C20	C22	C20	C16	C30	C25	
C	Special Needs Plan (SNP) Care Management	Plan Reporting	C08	C09/DMC11	DMC14	DMC14						
C	Testing to Confirm Chronic Obstructive Pulmonary Disease	HEDIS	DMC07	DMC07	DMC07	DMC07	DMC07	C21	C17	C31	C26	
D	4Rx Timeliness	Acumen/OIS (4Rx)					DMD03	D07	D07		D09	
D	Adherence - Proportion of Days Covered	Prescription Drug Event (PDE)						DMD07				
D	Appeals Auto–Forward	IRE / Maximus	D02	D01	D02	D03	D03	D05	D05	D05	D13	
D	Appeals Upheld	IRE / Maximus	D03	D02	D03	D04	D04	D06	D06	D06	D14	
D	Beneficiary Access and Performance Problems	Administrative Data	D06	DME08	D05	D07	D07	D10	D11			
D	Call Center – Beneficiary Hold Time	Call Center	DMD04		DMD04	DMD04	DMD05	D01	D01	D01	D01	
D	Call Center – Calls Disconnected - Pharmacist	Call Center							DMD05	D04	D04	
D	Call Center - Calls Disconnected When Customer Calls Drug Plan	Call Center	DMD03		DMD03	DMD03	DMD04	DMD04	DMD04	D02	D02	

Part	Measure name	Data source	2016	2015	2014	2013	2012	2011	2010	2009	2008	Notes
D	Call Center – CSR Understandability	Call Center							DMD06			
D	Call Center – Foreign Language Interpreter and TTY Availability	Call Center	D01		D01	D02	D02	D04	D04			
D	Call Center – Information Accuracy	Call Center			DMD05	DMD05	DMD06	D03	D03			
D	Call Center – Pharmacy Hold Time	Call Center	DMD11		DMD15	D01	D01	D02	D02	D03	D03	
D	Complaint Resolution	CTM							DMD07			
D	Complaints – Benefits	CTM								D07	D11	
D	Complaints – Enrollment	CTM						D08	D08	D08	D12	
D	Complaints – Other	CTM						D09	D09	D10		
D	Complaints – Pricing	CTM								D09	D17	
D	Complaints about the Drug Plan	CTM	D04	D03	D04	D06	D06				D05	
D	Diabetes Medication Dosing	Prescription Drug Event (PDE)	DMD06	DMD04	DMD07	DMD07	DMD08	DMD06	DMD09			
D	Diabetes Treatment	Prescription Drug Event (PDE)		D10	D12	D15	D14	D17	D19			
D	Drug Plan Provides Current Information on Costs and Coverage for Medicare's Web site	Acumen/OIS (LIS Match Rates)	DMD07	DMD05	DMD08	DMD08	DMD09	D14	D15	D15	D10	
D	Drug Plan Quality Improvement	Star Ratings	D07	D05	D07	D09						
D	Drug-Drug Interactions	Prescription Drug Event (PDE)	DMD05	DMD03	DMD06	DMD06	DMD07	DMD05	DMD08			
D	Enrollment Timeliness	MARx			DME01	D05	D05	DMD03	DMD03			
D	Getting Information From Drug Plan	CAHPS	DMD10	DMD09	DMD14	D10	D09	D11	D12	D12	D06	
D	Getting Needed Prescription Drugs	CAHPS	D09	D07	D09	D12	D11	D13	D14	D14	D08	

Part	Measure name	Data source	2016	2015	2014	2013	2012	2011	2010	2009	2008	Notes
D	High Risk Medication	Prescription Drug Event (PDE)	D11	D09	D11	D14	D13	D16	D18	D19		
D	Medication Adherence for Cholesterol (Statins)	Prescription Drug Event (PDE)	D14	D13	D15	D18	D17					
D	Medication Adherence for Diabetes Medications	Prescription Drug Event (PDE)	D12	D11	D13	D16	D15					
D	Medication Adherence for Hypertension (RAS antagonists)	Prescription Drug Event (PDE)	D13	D12	D14	D17	D16					
D	Medication Therapy Management Program Completion Rate for Comprehensive Medication Review	Prescription Drug Event (PDE)	D15	DMD07	DMD12	DMD12						
D	Member Retention	MBDSS								D11		
D	Members Choosing to Leave the Plan	MBDSS	D05	D04	D06	D08	D08	DMD09	D10			
D	MPF – Composite	Plan Finder Data					D12	D15				B
D	MPF – Stability	Plan Finder Data	DMD08	DMD06	DMD10	DMD10			D16	D17	D16	A
D	MPF – Updates	Plan Finder Data			DMD09	DMD09	DMD10	DMD08	DMD10	D16	D15	
D	MPF Price Accuracy	Plan Finder Data	D10	D08	D10	D13			D17	D18		A
D	Plan Submitted Higher Prices for Display on MPF	Plan Finder Data	DMD12	DMD10	DMD16							
D	Rate of Chronic Use of Atypical Antipsychotics by Elderly Beneficiaries in Nursing Homes	Fu Associates	DMD09	DMD08	DMD13	DMD13						
D	Rating of Drug Plan	CAHPS	D08	D06	D08	D11	D10	D12	D13	D13	D07	
D	Reminders to fill prescriptions	CAHPS	DMD15	DMD13								
D	Reminders to take medications	CAHPS	DMD16	DMD14								

Part	Measure name	Data source	2016	2015	2014	2013	2012	2011	2010	2009	2008	Notes
D	Timely Effectuation of Appeals	IRE / Maximus	DMD02	DMD02	DMD02	DMD02	DMD02	DMD02	DMD02			
D	Timely Receipt of Case Files for Appeals	IRE / Maximus	DMD01	DMD01	DMD01	DMD01	DMD01	DMD01	DMD01			
D	Transition monitoring - failure rate for all other drugs	Transition Monitoring Program	DMD14	DMD12								
D	Transition monitoring - failure rate for drugs within classes of clinical concern	Transition Monitoring Program Analysis	DMD13	DMD11								

Part C Notes:

A: Part of composite measure Cholesterol Screening in 2010

B: Composite Measure - combined Cardiovascular Care – Cholesterol Screening and Diabetes Care – Cholesterol Screening measures

C: Composite Measure - combined Diabetes Care – Blood Sugar Controlled, Diabetes Care – Cholesterol Controlled, Diabetes Care – Eye Exam and

Diabetes Care – Kidney Disease Monitoring measures

D: Part of composite measure Diabetes Care in 2010

Part D Notes:

A: Part of composite measure MPF - Composite in 2011 – 2012

B: Composite measure - combined MPF - Accuracy and MPF Stability

APPENDIX H: AREA DEPRIVATION INDEX (HEALTH INNOVATION, 2014)

The ADI is promulgated by the Health Innovation Program (HIP) at the University of Wisconsin at Madison and is based on an index originally developed by Gopal Singh, PhD, MS, MSc (Singh, 2003). ADI provides a measure of deprivation on a neighborhood basis (Health Innovation Program, 2014). A higher ADI indicates a more socioeconomically deprived neighborhood, a lower level of ADI indicates a lower level of deprivation.

The ADI is an American version of a composite deprivation index. Composite deprivation indices have in use internationally for many years (Singh, 2003). ADI is an oft-cited measure of deprivation. In fact, according to PubMed, 71 articles have referenced this original article. One of those conducted in 2016 by researchers associated with Intermountain Healthcare, tested the specifications and calculation of an ADI for the state of Utah. They found promising evidence of value in the use of ADI in that system's quality improvement efforts (Knighton, 2016).

The HIP version of ADI uses 2000 census block group-level data. The ADI is promulgated at multiple levels, including at the ZIP code, ZIP code +4, and county level. Because MA plans are filed at the county level, for the purpose of this study, county-level ADI was utilized. The ADI describes the neighborhood level of deprivation using the following variables:

- % aged 25+ with < 9 years of education
- % aged 25+ with at least a high school diploma
- % of people 16+ who are employed in white-collar occupations
- Median family income (US dollars)
- Income disparity
- Median home value (US dollars)
- Median gross rent (US dollars)

- Median monthly mortgage (US dollars)
- % owner-occupied housing units
- % civilian labor force population aged 16+ unemployed
- % families below federal poverty level
- % below 150% of the federal poverty threshold
- % single-parent households with children < 18 years of age
- % households without a motor vehicle
- % households without a telephone
- % occupied housing units without complete plumbing
- % households with more than 1 person per room

APPENDIX I: LINKS TO SOURCE DATA

Benefits

https://www.cms.gov/Research-Statistics-Data-and-Systems/Statistics-Trends-and-Reports/MCRAdvPartDEnrolData/Benefits-Data.html

Monthly Enrollment by Contract, Plan, State, County

https://www.cms.gov/Research-Statistics-Data-and-Systems/Statistics-Trends-and-Reports/MCRAdvPartDEnrolData/Monthly-Enrollment-by-Contract-Plan-State-County.html

Monthly Enrollment by Plan

https://www.cms.gov/Research-Statistics-Data-and-Systems/Statistics-Trends-and-Reports/MCRAdvPartDEnrolData/Monthly-Enrollment-by-Plan.html

LIS MAPD & MAPD Enrollment by Plan

https://www.cms.gov/Research-Statistics-Data-and-Systems/Statistics-Trends-and-Reports/MCRAdvPartDEnrolData/LIS-Enrollment-by-Plan.html

Landscape

https://www.cms.gov/Medicare/Prescription-Drug-Coverage/PrescriptionDrugCovGenIn/index.html

APPENDIX J: COEFFICIENTS

			Transportation ben				Meal ben				Nutritional ben			
Parameter			Est.	SE	Exp. Est		Est.	SE	ExpEst		Est.	SE	Exp. Est	
Intercept			-1.379	-0.169	0.252	***	-1.283	-0.16	0.277	***	-1.755	-0.195	0.173	***
SNP	1		2.454	-0.207	11.633	***	0.939	-0.221	2.558	***	2.246	-0.227	9.453	***
Weighted average ADI quintile	1		-0.092	-0.185	0.912		-1.129	-0.218	0.323	***	-0.596	-0.216	0.551	**
	2		-0.021	-0.184	0.979		-0.303	-0.183	0.739		-0.103	-0.206	0.902	
	4		-0.198	-0.175	0.82		-0.072	-0.172	0.93		-0.21	-0.199	0.811	
	5		0.132	-0.182	1.142		0.091	-0.176	1.095		0.062	-0.205	1.064	
Clis_mapd_cp_per			0.002	-0.003	1.002		0.003	-0.003	1.003		-0.004	-0.003	0.996	
Year	2015		0.048	-0.109	1.05		0.325	-0.124	1.385	**	-0.248	-0.142	0.78	
County-weighted average stars			0.214	-0.095	1.239	*	0.675	-0.082	1.964	***	1.188	-0.114	3.281	***
County-weighted percentage_rate_cap_0			-0.016	-0.007	0.984	*	0.003	-0.004	1.003		-0.018	-0.005	0.982	***
County weighted percentage _rate_cap_35			-0.006	-0.005	0.994		0.005	-0.004	1.005		0.024	-0.006	1.024	***
County-weighted percentage _rate_cap_5			-0.002	-0.003	0.998		-0.006	-0.003	0.994		-0.017	-0.005	0.983	**
cp_avg_ma_quintile	1		0.05	-0.17	1.051		0.207	-0.155	1.23		0.02	-0.192	1.02	
	2		0.084	-0.147	1.087		0.18	-0.137	1.197		0.149	-0.174	1.16	
	4		-0.302	-0.152	0.739	*	-0.107	-0.136	0.898		-0.379	-0.18	0.685	*
	5		0.087	-0.15	1.091		-0.511	-0.149	0.6	***	-0.148	-0.179	0.862	
wa_adi_quintile*year	1	2015	0.033	-0.143	1.034		0.491	-0.187	1.634	**	0.462	-0.191	1.588	*
	2	2015	0.074	-0.141	1.076		-0.203	-0.173	0.816		0.243	-0.193	1.276	
	4	2015	0.011	-0.158	1.011		0.131	-0.168	1.14		-0.476	-0.22	0.622	*
	5	2015	0.077	-0.15	1.08		0.007	-0.168	1.007		-0.609	-0.223	0.544	**
year*SNP	2015	1	-0.462	-0.151	0.63	**	-0.317	-0.193	0.728		-1.574	-0.233	0.207	***
Clis_mapd_cp_pe*year	2015		0.004	-0.002	1.004		-0.003	-0.002	0.997		0.002	-0.003	1.002	

			Telemonitoring				Premium				EDM			
Parameter			Est.	SE	Exp. Est		Est.	SE	Exp. Est		Est.	SE	Exp. Est	
Intercept			-1.851	-0.219	0.157	***	-0.491	-0.182	0.612	**	-2.176	-0.234	0.113	***
SNP	1		0.754	-0.253	2.125	**	-1.801	-0.264	0.165	***	0.907	-0.261	2.478	***
Weighted average ADI quintile	1		-0.145	-0.238	0.865		0.419	-0.174	1.521	*	0.125	-0.255	1.133	
	2		-0.355	-0.244	0.701		0.086	-0.17	1.09		-0.538	-0.293	0.584	
	4		-0.404	-0.25	0.668		0.099	-0.171	1.104		-0.57	-0.293	0.566	
	5		-1.019	-0.295	0.361	***	0.095	-0.177	1.1		-1.287	-0.354	0.276	***
Clis_mapd_cp_per			-0.016	-0.004	0.984	***	-0.048	-0.006	0.953	***	-0.019	-0.005	0.981	***
Year	2015		0.009	-0.144	1.009		-0.068	-0.182	0.934		-0.865	-0.247	0.421	***
County-weighted average stars			-0.104	-0.105	0.901		0.305	-0.094	1.356	**	0.124	-0.138	1.132	
County-weighted percentage_rate_cap_0			-0.005	-0.006	0.995		0.025	-0.007	1.025	***	0.003	-0.006	1.003	
County-weighted percentage _rate_cap_35			-0.014	-0.005	0.986	**	0.006	-0.004	1.006		0.003	-0.006	1.003	
County-weighted percentage _rate_cap_5			0.007	-0.003	1.007	*	0.005	-0.003	1.005		-0.002	-0.005	0.998	
cp_avg_ma_quintile	1		-0.641	-0.254	0.527	*	-0.137	-0.171	0.872		-1.058	-0.313	0.347	***
	2		0.041	-0.188	1.042		0.13	-0.146	1.139		-0.504	-0.246	0.604	*
	4		-0.44	-0.203	0.644	*	-0.05	-0.138	0.951		-0.416	-0.245	0.66	
	5		-0.869	-0.225	0.419	***	-0.735	-0.137	0.479	***	-0.348	-0.236	0.706	
Weighted average ADI quintile*year	1	2015	0.132	-0.178	1.141		-0.086	-0.17	0.918		-0.127	-0.283	0.88	
	2	2015	0.576	-0.216	1.779	**	-0.091	-0.18	0.913		0.154	-0.302	1.166	
	4	2015	0.121	-0.22	1.128		-0.262	-0.192	0.769		0.115	-0.292	1.122	
	5	2015	0.365	-0.219	1.44		0.073	-0.187	1.075		-0.379	-0.332	0.685	
year*SNP	2015	1	-0.17	-0.137	0.844		-0.099	-0.28	0.906		.		.	
Clis_mapd_cp_pe*year	2015		-0.001	-0.003	0.999		-0.01	-0.008	0.99		-0.04	-0.011	0.961	***

APPENDIX K: DESCRIPTIVE STATISTICS

	Transportation Ben				Meal Ben				Nutritional Ben			
	No		Yes		No		Yes		No		Yes	
Attribute	2014	2015	2014	2015	2014	2015	2014	2015	2014	2015	2014	2015
Number of plans	12,92	1,244	613	587	1,494	1,338	411	493	1,398	1,503	393	235
Proportion of SNP plans	0.077	0.092	0.54	0.518	0.183	0.2	0.382	0.304	0.137	0.196	0.478	0.281
Mean # of counties the in which the Plan Offering was available	17.9	17.695	13.38	13.106	16.682	16.561	15.586	15.308	18.303	17.008	9.443	9.387
Mean LIS MAPD enrollment	1,240.455	1,319.396	2,291.869	2,706.293	1,721.102	1,899.738	1,061.453	1,395.688	1,566.893	1,639.661	1,552.99	2,160.638
Mean MAPD enrollment	6,663.512	7,114.469	5,466.31	6,319.499	6,980.162	7,479.509	3,726.869	5,177.207	6,725.615	6,900.9	5,328.865	7,782.2
Mean proportion of LIS MAPD/MAPD enrollment	0.211	0.217	0.486	0.476	0.276	0.29	0.388	0.327	0.254	0.285	0.401	0.279
Mean total plan enrollment	6,714.525	7,147.186	5,582.458	6,372.7	7,050.785	7,517.603	3,803.747	5,219.72	6,787.667	6,938.584	5,436.651	7,833.166
Proportion of plans in the first quintile of total plan size	0.129	0.107	0.186	0.157	0.129	0.118	0.214	0.136	0.127	0.121	0.214	0.115
Proportion of plans in the second quintile of total plan size	0.178	0.187	0.217	0.201	0.175	0.182	0.248	0.219	0.177	0.184	0.229	0.221
Proportion of plans in the third quintile of total plan size	0.215	0.219	0.21	0.223	0.207	0.221	0.238	0.217	0.207	0.209	0.204	0.234
Proportion of plans in the fourth quintile of total plan size	0.251	0.244	0.176	0.186	0.238	0.22	0.185	0.239	0.245	0.242	0.183	0.166
Proportion of plans in the fifth quintile of total plan size	0.227	0.243	0.21	0.233	0.251	0.259	0.114	0.189	0.245	0.244	0.17	0.264
Mean weighted star rating	3.804	3.867	3.742	3.827	3.765	3.786	3.854	4.04	3.725	3.829	4.001	4.166

	Transportation Ben				Meal Ben				Nutritional Ben			
Mean of the weighted proportion of counties with a stars bonus cap of 0%	0.099	0.095	0.033	0.033	0.075	0.07	0.087	0.09	0.084	0.076	0.038	0.065
Mean of the weighted proportion of counties with a stars bonus cap of 3.5%	0.182	0.178	0.069	0.085	0.143	0.147	0.155	0.154	0.154	0.144	0.102	0.176
Mean of the weighted proportion of counties with a stars bonus cap of 5%	0.256	0.249	0.126	0.143	0.216	0.216	0.21	0.213	0.231	0.215	0.138	0.212
Mean weighted ADI	80.096	79.271	77.263	75.524	77.629	76.149	84.841	83.284	79.214	79.57	80.901	72.881
Proportion of plans in the first quintile of weighted ADI	0.188	0.203	0.21	0.228	0.223	0.235	0.095	0.146	0.203	0.201	0.148	0.213
Proportion of plans in the second quintile of weighted ADI	0.188	0.195	0.21	0.208	0.194	0.212	0.2	0.162	0.179	0.182	0.232	0.285
Proportion of plans in the third quintile of weighted ADI	0.197	0.201	0.189	0.187	0.187	0.188	0.224	0.221	0.196	0.194	0.209	0.234
Proportion of plans in the fourth quintile of weighted ADI	0.221	0.206	0.188	0.174	0.2	0.179	0.246	0.241	0.211	0.208	0.209	0.14
Proportion of plans in the fifth quintile of weighted ADI	0.206	0.196	0.202	0.203	0.196	0.187	0.236	0.229	0.211	0.215	0.204	0.128

	Telemonitoring Benefit				Premium				EDM			
	No		Yes		No		Yes		No		Yes	
Attribute	2014	2015	2014	2015	2014	2015	2014	2015	2014	2015	2014	2015
Number of plans	1,622	1,542	169	196	1,079	1,033	820	788	1,671	1,641	120	97
Proportion of SNP plans	0.211	0.209	0.219	0.199	0.383	0.387	0.022	0.023	0.206	0.22	0.283	0
Mean number of counties the in which the Plan Offerings were available	17.123	16.745	9.024	9.939	13.495	12.621	20.318	20.924	16.642	16.291	12.425	10.67
Mean LIS MAPD enrollment	1,619.789	1,809.77	1,026.888	925.99	2,286.547	2,481.163	642.812	792.751	1,605.904	1,761.68	978.142	837.557
Mean MAPD enrollment	6,650.287	7,402.178	4,200.521	4,013.837	7,174.821	7,475.064	5,035.539	5,846.915	6,472.829	7,049.524	5,671.3	6,521.66
Mean proportion of LIS MAPD/MAPD enrollment	0.292	0.293	0.23	0.218	0.425	0.428	0.136	0.134	0.292	0.294	0.206	0.123
Mean total plan enrollment	6,725.436	7,445.223	4,243.225	4,025.265	7,295.869	7,531.915	5,043.11	5,861.424	6,549.611	7,091.561	5,678.017	6,517.876
Proportion of plans in the first quintile of total plan size	0.151	0.119	0.101	0.133	0.158	0.136	0.135	0.108	0.148	0.124	0.117	0.062
Proportion of plans in the second quintile of total plan size	0.183	0.179	0.237	0.27	0.168	0.188	0.221	0.199	0.189	0.191	0.175	0.155
Proportion of plans in the third quintile of total plan size	0.2	0.204	0.266	0.276	0.204	0.21	0.228	0.236	0.202	0.208	0.267	0.289
Proportion of plans in the fourth quintile of total plan size	0.231	0.237	0.231	0.184	0.212	0.208	0.246	0.251	0.235	0.23	0.183	0.258
Proportion of plans in the fifth quintile of total plan size	0.235	0.261	0.166	0.138	0.259	0.258	0.17	0.206	0.226	0.247	0.258	0.237
Mean weighted star rating	3.782	3.875	3.817	3.872	3.689	3.762	3.907	3.975	3.774	3.869	3.946	3.969
Mean of the weighted proportion of counties with a stars bonus cap of 0%	0.077	0.078	0.043	0.049	0.035	0.037	0.134	0.126	0.075	0.074	0.067	0.087
Mean of the weighted proportion of counties with a stars bonus cap of 3.5%	0.149	0.153	0.082	0.115	0.079	0.091	0.233	0.224	0.146	0.145	0.098	0.209
Mean of the weighted proportion of counties with a stars bonus cap of 5%	0.214	0.216	0.181	0.198	0.141	0.147	0.312	0.304	0.214	0.211	0.164	0.267
Mean Weighted ADI	79.916	79.082	76.4	75.39	79.271	77.817	79.274	78.381	80.232	78.959	70.557	73.695
Proportion of plans in the first quintile of weighted ADI	0.187	0.2	0.225	0.224	0.198	0.219	0.187	0.201	0.184	0.199	0.283	0.268

	Telemonitoring Benefit				Premium				EDM			
Proportion of plans in the second quintile of weighted ADI	0.189	0.187	0.201	0.265	0.196	0.197	0.195	0.202	0.192	0.196	0.175	0.206
Proportion of plans in the third quintile of weighted ADI	0.191	0.196	0.272	0.224	0.199	0.196	0.19	0.198	0.193	0.194	0.275	0.289
Proportion of plans in the fourth quintile of weighted ADI	0.213	0.204	0.189	0.163	0.206	0.198	0.217	0.189	0.213	0.2	0.175	0.175
Proportion of plans in the fifth quintile of weighted ADI	0.219	0.213	0.112	0.122	0.2	0.19	0.211	0.211	0.218	0.211	0.092	0.062

APPENDIX L: PHASE 2 DATA TABLES

Risk difference of transportation benefit inclusion by weighted average ADI quintile

Test- ADI quintile	Referent ADI quintile	Test year	Referent year	RD
1	1	2015	2014	-0.037
1	2	2014	2014	-0.018
1	2	2015	2015	-0.027
1	3	2014	2014	-0.023
1	3	2015	2015	-0.014
1	4	2014	2014	0.026
1	4	2015	2015	0.03
1	5	2014	2014	-0.056
1	5	2015	2015	-0.066
2	2	2015	2014	-0.028
2	3	2014	2014	-0.005
2	3	2015	2015	0.013
2	4	2014	2014	0.043
2	4	2015	2015	0.057
2	5	2014	2014	-0.038
2	5	2015	2015	-0.039
3	3	2015	2014	-0.046
4	3	2014	2014	-0.049
4	3	2015	2015	-0.044
4	4	2015	2014	-0.042
4	5	2014	2014	-0.082
4	5	2015	2015	-0.096*
5	3	2014	2014	0.033
5	3	2015	2015	0.051
5	5	2015	2014	-0.028

Risk difference of a premium required by ADI weighted average quintile

Test- ADI quintile	Referent- ADI quintile	Test year	Referent year	RD
1	1	2015	2014	-0.035
1	2	2014	2014	0.058
1	2	2015	2015	0.053
1	3	2014	2014	0.071*
1	3	2015	2015	0.052
1	4	2014	2014	0.056
1	4	2015	2015	0.074**
1	5	2014	2014	0.057
1	5	2015	2015	0.027
2	2	2015	2014	-0.029
2	3	2014	2014	0.013
2	3	2015	2015	-0.001
2	4	2014	2014	-0.002
2	4	2015	2015	0.021
2	5	2014	2014	-0.002
2	5	2015	2015	-0.026
3	3	2015	2014	-0.015
4	3	2014	2014	0.015
4	3	2015	2015	-0.022
4	4	2015	2014	-0.052
4	5	2014	2014	0.001
4	5	2015	2015	-0.047
5	3	2014	2014	0.015
5	3	2015	2015	0.025
5	5	2015	2014	-0.005

Risk difference of telemonitoring benefit inclusion by weighted average ADI quintile

Test- ADI quintile	Referent ADI quintile	Test year	Referent year	RD
1	1	2015	2014	0.006
1	2	2014	2014	0.021
1	2	2015	2015	-0.029
1	3	2014	2014	-0.017
1	3	2015	2015	-0.002
1	4	2014	2014	0.025
1	4	2015	2015	0.028
1	5	2014	2014	0.068**
1	5	2015	2015	0.057*
2	2	2015	2014	0.056**
2	3	2014	2014	-0.038
2	3	2015	2015	0.027
2	4	2014	2014	0.004
2	4	2015	2015	0.056*
2	5	2014	2014	0.047*
2	5	2015	2015	0.086**
3	3	2015	2014	-0.009
4	3	2014	2014	-0.042
4	3	2015	2015	-0.029
4	4	2015	2014	0.004
4	5	2014	2014	0.043*
4	5	2015	2015	0.029
5	3	2014	2014	-0.085***
5	3	2015	2015	-0.059*
5	5	2015	2014	0.017

Risk difference of meals benefit inclusion by ADI quintile

Test- ADI quintile	Referent- ADI quintile	Test year	Referent year	RD
1	1	2015	2014	0.089***
1	2	2014	2014	-0.118***
1	2	2015	2015	-0.023
1	3	2014	2014	-0.177***
1	3	2015	2015	-0.124***
1	4	2014	2014	-0.162***
1	4	2015	2015	-0.138***
1	5	2014	2014	-0.196***
1	5	2015	2015	-0.147***
2	2	2015	2014	-0.006
2	3	2014	2014	-0.059
2	3	2015	2015	-0.102**
2	4	2014	2014	-0.044
2	4	2015	2015	-0.115**
2	5	2014	2014	-0.079*
2	5	2015	2015	-0.124***
3	3	2015	2014	0.037
4	3	2014	2014	-0.015
4	3	2015	2015	0.013
4	4	2015	2014	0.065*
4	5	2014	2014	-0.034
4	5	2015	2015	-0.009
5	3	2014	2014	0.019
5	3	2015	2015	0.022
5	5	2015	2014	0.039

Risk difference of nutrition benefit inclusion by ADI quintile

Test ADI quintile	Referent ADI quintile	Test year	Referent year	RD
1	1	2015	2014	-0.083***
1	2	2014	2014	-0.096*
1	2	2015	2015	-0.036
1	3	2014	2014	-0.118**
1	3	2015	2015	-0.016
1	4	2014	2014	-0.073
1	4	2015	2015	0.053*
1	5	2014	2014	-0.132**
1	5	2015	2015	0.042
2	2	2015	2014	-0.143***
2	3	2014	2014	-0.023
2	3	2015	2015	0.019
2	4	2014	2014	0.023
2	4	2015	2015	0.089***
2	5	2014	2014	-0.037
2	5	2015	2015	0.078**
3	3	2015	2014	-0.185***
4	3	2014	2014	-0.045
4	3	2015	2015	-0.07**
4	4	2015	2014	-0.21***
4	5	2014	2014	-0.059
4	5	2015	2015	-0.011
5	3	2014	2014	0.014
5	3	2015	2015	-0.058*
5	5	2015	2014	-0.258***

Risk difference of EDM benefit inclusion by weighted average ADI quintile

Test- ADI quintile	Referent- ADI quintile	Test year	Referent year	RD
1	1	2015	2014	-0.066**
1	2	2014	2014	0.054*
1	2	2015	2015	0.016
1	3	2014	2014	0.012
1	3	2015	2015	0
1	4	2014	2014	0.056*
1	4	2015	2015	0.018
1	5	2014	2014	0.087***
1	5	2015	2015	0.042***
2	2	2015	2014	-0.028
2	3	2014	2014	-0.041
2	3	2015	2015	-0.016
2	4	2014	2014	0.002
2	4	2015	2015	0.002
2	5	2014	2014	0.033*
2	5	2015	2015	0.026**
3	3	2015	2014	-0.053***
4	3	2014	2014	-0.043
4	3	2015	2015	-0.019
4	4	2015	2014	-0.029*
4	5	2014	2014	0.031
4	5	2015	2015	0.024*
5	3	2014	2014	-0.074***
5	3	2015	2015	-0.042***
5	5	2015	2014	-0.021**

Comparison of benefit availability/premium requirement by year, by SNP versus non-SNP plans (EDM is excluded because it was not available to SNP plans beginning in 2015)

Test SNP indicator (yes=1, no=0)	Referent SNP Indicator (yes=1, no=0)	Test year	Referent year	RD
Transportation				
1	1	2015	2014	-0.08**
1	0	2015	2015	0.449***
1	0	2014	2014	0.542***
0	0	2015	2014	0.013
Meals				
1	1	2015	2014	0.022
1	0	2015	2015	0.128**
1	0	2014	2014	0.171***
0	0	2015	2014	0.065***
Nutrition				
1	1	2015	2014	-0.405***
1	0	2015	2015	0.074**
1	0	2014	2014	0.447***
0	0	2015	2014	-0.031***
Telemonitoring				
1	1	2015	2014	0.01
1	0	2015	2015	0.06*
1	0	2014	2014	0.069**
0	0	2015	2014	0.018**
Premium				
1	1	2015	2014	-0.018
1	0	2015	2015	-0.282***
1	0	2014	2014	-0.294***
0	0	2015	2014	-0.03

APPENDIX M: PHASE 1 KEY INFORMANT RECRUITMENT LETTER

UNC GILLINGS SCHOOL OF GLOBAL PUBLIC HEALTH

DEPARTMENT OF HEALTH POLICY AND MANAGEMENT
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SHOOU-YIH DANIEL LEE, MS, PHD
Professor and Chair
Department of Health Policy and Management

MARK HOLMES, PhD
Associate Chair for Research

JOHN E. PAUL, PhD
Associate Chair for Academics

JANUARY 22, 2016

[Key Informant Name, Address]

Dear [Key Informant],

I am writing to request your participation as a key informant in the research I am conducting entitled "The Potential Implications of the Medicare Stars Methodology for Plans Serving Low Socioeconomic Status Communities." The purpose of this research is to investigate the potential impact of the Medicare stars quality and payment system on health plan performance, particularly as it relates to individuals and communities with lower SES status. Specifically, the purpose of this study is to understand whether Medicare Advantage plans that serve high proportions of individuals with low SES status face barriers in performing well under the stars methodology, whether Medicare Advantage plans have modified or intend to modify their policies and practices in light of the Medicare stars program, and to explore the policy implications of any changes and/or barriers identified. You have been asked to participate in this study because you are a Medicare provider.

I am conducting this interview as a part of my dissertation for the Doctorate of Public Health program at the University of North Carolina Chapel Hill. The results of this study will be used to develop recommendations to health plans and policymakers regarding the need for and, if necessary, possible methods to modify the stars methodology to effectively address the differential needs of Medicare beneficiaries who possess SES characteristics associated with poorer health outcomes.

The Doctorate of Public Health program at the University of North Carolina is an executive program. Each of the participants work full time in health related fields. In my case, in addition to pursuing my doctorate, I am a vice president at WellCare Health Plans which is a Medicare Advantage plan sponsor. In order to protect against bias in my research results, I have engaged the assistance of an independent biostatistician to assist with the design of my quantitative analysis and a second coder to assist with the analysis of my qualitative results. In addition, my research is actively supervised by my dissertation committee chaired by Dr. Pam Silberman. In addition, all information from respondents will be confidential, and I will send you back my summary of our interview notes so that you can review them for accuracy. Finally, I'm glad to send you a copy of my research findings if you are willing to participate in the study.

The interview will take approximately an hour. Your participation is a critical component in gaining a complete understanding of the potential impact of the Medicare stars quality as it relates to plans serving individuals and communities with lower SES status.

If you are interested in participating, please reply to this letter via email at ecgoodma@live.unc.edu or call me at 813-758-1006. You can also contact my faculty advisor, Dr. Pam Silberman, JD, Dr.PH at 919-966-4525 or pam_silberman@unc.edu if you have any questions or concerns. I will also be following this letter shortly with a call to your office to answer any questions you might have about the study or the interview. Thank you in advance for your consideration.

Very Truly Yours,

Elizabeth Cahn Goodman

APPENDIX N: PHASE 3 SURVEY

ECG Dissertation Phase 3 questionnaire

Survey of Impression of Key Informant Recommendations

You are being asked to provide your insights on the impact of different policy options on the ability of Medicare Advantage plans serving high proportions of low-SES populations to improve the quality of care for their members. These policy options were selected for your review because they were most often identified by respondents in phase 1 of this research. Specifically, we are asking you to evaluate the different policy proposals based on:

- The extent to which the proposal would maintain or increase plan offerings tailored to low SES communities
- The extent to which the proposal would improve the quality of health care to disadvantaged communities
- The extent to which the proposal improves accuracy of the Medicare stars rating methodology
- The extent to which the change in policy represents an improvement over the status quo

We know that you may not know the exact impact of the different policy options on each evaluation criteria. Nonetheless, as a representative of a different key informant group (eg, consumer, provider, plan, regulator/policymaker, or thought leader), we would like your input into the strength and weaknesses of various proposals. Please rate each proposal (questions 2-4) using the scale below:

0 = I don't know
1 = Strongly Negative Change
2 = Somewhat Negative Change
3 = No Significant Change
4= Somewhat Positive Change
5 = Strongly Positive Change

* 1. 1. Please indicate which category of respondent best represents your input:

- ◯ Consumer representative
- ◯ Provider representative
- ◯ Plan representative
- ◯ Regulator/policy maker/quality measurement official
- ◯ Academic/Thought leader

* 2. Please provide feedback on the following recommended changes that CMS could make to the stars methodology

	The extent to which proposal will maintain/increase plan offerings tailored to low SES communities	The extent to which proposal will improve the quality of health care in disadvantaged communities	The extent to which proposal improves the accuracy of the Medicare stars methodology	The extent to which the change in policy represents an improvement over the status quo
Stratify: Stratify the results of performance on quality measures to reflect social and demographic characteristics of plan membership e.g. by race, ethnicity, gender, socioeconomic status, etc. to compare performance of plans serving similar populat				
Risk adjust: Risk Adjust SES sensitive measures for socioeconomic status in addition to risk adjusting for underlying health status				
Refine the measure set to focus on measures that are more important to low SES populations				
Refine the measure set to focus on measures that are within the control of the provider or plan				
Measure quality at the plan benefit package level rather than at the level of the contract between CMS and the plan				
Refine the measure set to focus more on improvement than achievement.				

* 3. Please provide feedback on the following recommended incentives that CMS could make available to MA plans

	The extent to which proposal will maintain/increase plan offerings tailored to low SES communities	The extent to which proposal will improve the quality of health care in disadvantaged communities	The extent to which proposal improves the accuracy of the Medicare stars methodology	The extent to which the change in policy represents an improvement over the status quo
Provide financial or other incentives to encourage plans to refine and enhance care coordination and care management techniques (ex. Health homes, staffing models, caregiver support)				
Provide financial or other incentives to encourage plans to improve access to care for low SES populations				
Provide financial or other incentives to encourage plans to improve access to social supports				
Provide financial or other incentives to encourage plans to partner with community organizations				

* 4. Please provide feedback on the following recommended changes that CMS could make to the MA program and its MA payment policies

	The extent to which proposal will maintain/increase plan offerings tailored to low SES communities	The extent to which proposal will improve the quality of health care in disadvantaged communities	The extent to which proposal improves the accuracy of the Medicare stars methodology	The extent to which the change in policy represents an improvement over the status quo
Change uniformity of benefit rules to allow more flexibility for plans to tailor benefit packages including supplemental benefits to the needs of low SES beneficiaries				

* 5. Please use this space to provide any other thoughts and comments about the proposed recommendations

Done

APPENDIX O: STAKEHOLDER ANALYSIS

Stakeholders	Likely position on improving the quality of care for low SES MA beneficiaries	Power of the group and the resources they bring to bear	Likelihood of engagement	Factors that might influence their participation
Organizations that advocate for people with disabilities, seniors and Medicare consumers (e.g., Disability Policy Consortium, Community Catalyst, AARP, Medicare Rights Center, Justice in Aging, the Centers for Independent Living)	Consumer representatives interviewed in phase 1 opposed risk adjustment, but supported stratification. Some expressed concern that tailoring benefits to low SES populations could be used to reduce benefit package for all consumers. Certain consumer organizations frequently engage in advocacy on the issues related to MA.(Sanders, 2014)	Power: Moderate Resources: Large grassroots networks, long-standing relationships with state agencies and legislatures, CMS and Congress	Likelihood of Engagement: High They have long been involved in issues related to MA, Medicaid and quality.	Direct personal request to participate Alignment of these efforts with ongoing MassHealth restructuring Potential inclusion of MA and SES on the agenda of Congress and Trump Administration Participation of aligned organizations could influence their participation
Physician organizations (e.g., the State and American Medical Association (AMA), the National Medical Association (NMA), and the National Hispanic Medical Association (NHMA, CAPG))	Deeply engaged on how quality will be measured in the MassHealth restructuring programs and in the federal value based payment programs required under MACRA .("Medicare Access and CHIP Reauthorization Act of 2015," 2015) Engaged to the extent that it impacts physicians participate in MA networks.	Power: Strong Resources: Large membership networks including physicians, employed staff and affiliated institutions, large financial resources, large presence in Washington, DC, and all state Capitols	Likelihood of Engagement: Medium Given their focus on the MassHealth restructuring and MACRA, these organizations would be more likely to participate in a coalition focused on the broader impact of SES on quality measurement	Direct personal outreach to the staff engaged on physician quality measurement. Alignment of these efforts with ongoing MassHealth restructuring Direct impact on members Participation of aligned organizations could influence their participation

Stakeholders	Likely position on improving the quality of care for low SES MA beneficiaries	Power of the group and the resources they bring to bear	Likelihood of engagement	Factors that might influence their participation
Patient and provider organizations focused on minority communities (e.g., NAACP, National Council of La Raza, the Urban League, the National Alliance for Hispanic Health, NMA, MHMA, and the National Minority Quality Forum)	Active on the issue of Medicare Advantage(Dawes, 2015; Delgado, 2015; "The Better Medicare Alliance: Our Allies," 2015) these organizations represent racial and ethnic groups that have traditionally been subject to health disparities. Given the proportion of low SES populations that are also people of color they have long been engaged in issues of health equity. Likely proponents of efforts to improve quality for low SES populations.	Power: Moderate Resources: These organizations have long-standing relationships with CMS and Congress but only a few have a significant presence at the state level	Likelihood of Engagement: High These organization have long been involved in the issues of quality of care and health disparities	Participation of aligned organizations could influence their participation Potential inclusion of MA and SES on the agenda of Congress and Trump Administration
Hospital Associations (e.g., the American Hospital Association, Massachusetts Hospital Association and the Federation of American Hospitals)	General concern about establishing fair measurement methodologies throughout Medicare, impact of the HRRP and other penalty programs of hospitals and the implementation of the Hospital five-star program (C. N. Kahn et al., 2015) Critical stakeholder in MassHealth restructuring but their presence in post-acute and long term care is limited	Power: Strong Resources: Large membership networks including employed staff and community leadership, large financial resources, a large presence in Washington, DC, and all state Capitols	Likelihood of engagement: Medium Given their engagement on other quality measurement programs it is more likely that they would participate if the effort includes the quality of care for all low SES patients rather than just MA beneficiaries	Direct personal outreach to the staff engaged on hospital quality measurement. The other organizations and individuals that agree to participate in, support, or validate the activities of the coalition. Impact on Chronic Disease and Rehab hospitals and services provided by hospital-led health systems Alignment with MassHealth restructuring and national Medicare activity

Stakeholders	Likely position on improving the quality of care for low SES MA beneficiaries	Power of the group and the resources they bring to bear	Likelihood of engagement	Factors that might influence their participation
Safety Net Provider Organizations (e.g., America's Essential Hospital and the American Association of Medical Colleges, National Association of Community Health Centers, Massachusetts League of Community Health Centers)	Represent safety net hospitals, community health centers and medical faculties. Long supportive of efforts to risk adjust the HRRP for socioeconomic status. Actively lobbying Congress address the issue of SES in the HRRP in the current lame duck session (Dixon, 2016). Critical stakeholder in MassHealth restructuring but their presence in post-acute and long term care is limited	Power: Strong to Moderate Resources: Large membership networks including physicians, employed staff and affiliated institutions, large financial resources, a large presence in Washington, DC, and all state capitols.	Likelihood of engagement: Medium Given their engagement on other quality measurement programs it is more likely that they would participate if the effort includes the quality of care for all low SES patients rather than just MA beneficiaries	Direct personal outreach to the staff engaged on hospital quality measurement. The other organizations and individuals that agree to participate in, support, or validate the activities of the coalition. Impact on services delivered by safety-net providers Alignment with MassHealth restructuring and national Medicare activity
Nursing Home and Long Term Care Provider Organizations (e.g., American Healthcare Association, Leading Age, Mass Senior Care)	Represent nursing homes, assisted living residences and low income housing for seniors and people with disabilities	Power: Strong Resources: Large membership networks, politically powerful in D.C. and in the states.	Likelihood of engagement: High The planning quality measurement effort will directly impact the providers they represent	Direct personal outreach to the local trade association leadership The other organizations and individuals that agree to participate in, support, or validate the activities of the coalition. Alignment with MassHealth restructuring and national Medicare activity

Stakeholders	Likely position on improving the quality of care for low SES MA beneficiaries	Power of the group and the resources they bring to bear	Likelihood of engagement	Factors that might influence their participation
Health plans and trade associations (examples include: MAHP, AHIP, ACHP, ACAP, MHPA, SNP Alliance, BCBSA, Better Medicare Alliance)	Positions differ based on proportion of high performing and low-income serving plans. Generally concerned about the impact of the many cuts to the program since ACA but likely to take differing positions on the proposed changes (Bringewatt, 2005; Cahow et al., 2010; Myers, 2014; Swanson & Goetsch, 2015; Weiss & Pescatello, 2014)	Power: Strong Resources: Large financial resources, a large presence in Washington, DC, and all state capitols	Likelihood of engagement: Dependent on the organization: Those focused on duals and Medicaid (SCO and One Care plans, ACAP, SNP Alliance, and MHPA) are highly likely to engage; those focused on commercial insurers or anchored by high performing plans (Better Medicare Alliance, BCBSA, AHIP) will engage only if they feel the proposals will benefit their membership	Impact on plan operarations and compensation Engagement of member plans and trade association staff focusing on those who have expressed a favorable position on addressing the issue in the past.
MedPAC	Has identified disparate performance between high and low dual eligible plans. Concerned about differential cost of MA and traditional Medicare (Harrison & Zarabozo, 2014)	Power: High MedPAC advises Congress and the executive branch on policy related to the Medicare program. Their reports are reviewed by member of Congress, their staff and the executive branch and their research is generally considered cited as authoritative in the field.	Likelihood of engagement: None	This effort is outside of MedPAC's role. However, if the results of these efforts produce actionable data, they could be willing to discuss outcomes.

Stakeholders	Likely position on improving the quality of care for low SES MA beneficiaries	Power of the group and the resources they bring to bear	Likelihood of engagement	Factors that might influence their participation
CMS/HHS/Administration	Concerned about protecting the integrity of the existing stars program. Made significant changes to both the stars methodology with the application of CAI and the risk adjustment program in 2017 (CMS, 2015b) ASPE report acknowledging disparities in performance among beneficiaries with social risk factors issued in the previous administration. Position on the issue under new leadership unclear (*Report to Congress: Social Risk Factors and Performance Under Medicare's Value-Based Purchasing Programs*, 2016).	Power: Strong CMS's engagement and and support of this effort is a critical determinant of its success or failure. Payment methodologies for Medicaid covered services must be approved under a waiver or via the state plan. Massachusetts and CMS partner on the administration of the SCO and One Care programs.	Likelihood of engagement: Unknown The technical support from CMS received to date is an indication of support of MassHealth's efforts to move toward value based purchasing. Their willingness to be active thought partners in the development of the measure set and the accounting for SES and other factors is, as yet, unknown	The change in administration Budget neutrality Stakeholder feedback Alignment with CMS policy
Organization that represent states and their agencies (e.g., the National Governors Association/National Association of Medicaid Directors/National Association of State Health Policy)	States are required to contract with DSNP plans for service to duals, Constituents are impacted by the quality of the health plan, States have long been engaged on issues related to dual eligible beneficiaries (*Dual Eligibles: Making the Case for Federalization* 2005) and are increasingly active on due to concerns about costs to states of their Medicare premium (Crippen, 2016; "NAMD statement on 2017 Medicare part B premiums," 2016)	Power: Moderate States have a great deal of power when working collaboratively with their Congressional delegations. States work closely with CMS on issues related to Medicaid	Likelihood of engagement: Moderate The change in administration and Congressional efforts to repeal and replace Obamacare and block grant Medicaid have led to significant engagement with HHS and Congress by these organizations	States and the organizations representing states look to their members to form their agenda. Only once the program is in place and data become available regarding its impact and with the approval of my superiors would outreach to these organizations would be appropriate.

Stakeholders	Likely position on improving the quality of care for low SES MA beneficiaries	Power of the group and the resources they bring to bear	Likelihood of engagement	Factors that might influence their participation
Quality Measurement Organizations (e.g., National Quality Forum (NQF), the Pharmacy Quality Alliance (PQA), and National Committee on Quality Assurance (NCQA))	The NQF is piloting risk adjustment for sociodemographic factors.(Burstin, H., Amin, T., Isijola, W., 2015) They are actively engaged in evaluating disparities-sensitive measures and modifying measurement processes to address health disparities.("Disparities,") PQA is undertaking a similar effort with respect to measures of medication adherence. NCQA is the promulgator of HEDIS measures. The NCQA has publicly opposed to risk adjustment of individual measures, supportive of stratification and financial incentives (O'Kane, 2014)	Power: High These organizations are Thought leaders in the quality improvement community and vendors to CMS for the development and endorsement of measures of quality.	Likelihood of engagement: High These organizations are important resources for input and guidance in program design	Outreach from MassHealth leadership Use of measures promulgated or endorsed by these organizations Alignment with their ongoing efforts
Think Tanks/Policy Entrepreneurs/Academics and Consultants (examples range from research organizations including the New England Health Policy Institute, the Blue Cross Blue Shield of Massachusetts Foundation, the Pioneer Institute, local universities	Important partners in furthering a quality and equity strategy. Many of the individuals published in the review of the literature are, or were, affiliated with universities in the Boston area and represent an important program design resource	Power: Dependent on the Think Tank/Policy Entrepreneur/Academic	Dependent on the Think Tank/Policy Entrepreneur/Academic	Outreach to request they present their work in the area and/or take a thought leadership role in design and evaluation

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